

VAX-11/750 Installation Manual

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VAX-11/750

Installation Manual

Prepared by Educational Services
of
Digital Equipment Corporation

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Table P-1 lists related hardware manuals.

Table P-1 Related Hardware Manuals

Title	Document Number
<i>VAX-11/750 Diagnostic System Overview Manual</i>	EK-VX750-UG
<i>Diagnostic System User's Guide</i>	EK-VX11D-UG
<i>VAX-11/750 Central Processor Unit Technical Description</i>	EK-KA750-TD
<i>VAX-11/750 UNIBUS Interface Technical Description</i>	EK-UI750-TD
<i>VAX-11/750 Memory System Technical Description</i>	EK-MS750-TD
<i>VAX-11/750 Power System Technical Description</i>	EK-PS750-TD
<i>RH750 MASSBUS Adapter Technical Description</i>	EK-RH750-TD
<i>Microdiagnostic Mini Reference Guide</i>	EK-KC750-RM
<i>DR750 General Purpose Interface User's Guide</i>	EK-DR750-UG

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PART I
SYSTEM INSTALLATION

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WARNING

THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND IF NOT INSTALLED AND USED IN ACCORDANCE WITH THIS INSTALLATION MANUAL, MAY CAUSE INTERFERENCE TO RADIO COMMUNICATIONS. IT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS A COMPUTING DEVICE PURSUANT TO SUBPART J OR PART 15 OF FCC RULES, WHICH ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST SUCH INTERFERENCE WHEN OPERATED IN A COMMERCIAL ENVIRONMENT. OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA MAY CAUSE INTERFERENCE, IN WHICH CASE THE USER AT HIS OWN EXPENSE MAY BE REQUIRED TO TAKE MEASURES TO ELIMINATE THE INTERFERENCE.

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CHAPTER 1

SYSTEM INSTALLATION

1.1 UNPACKING AND INSPECTION

1. Unpack and deskid the CPU and the expander cabinet per the Cabinet Unpacking Procedure, Figure 1-1.

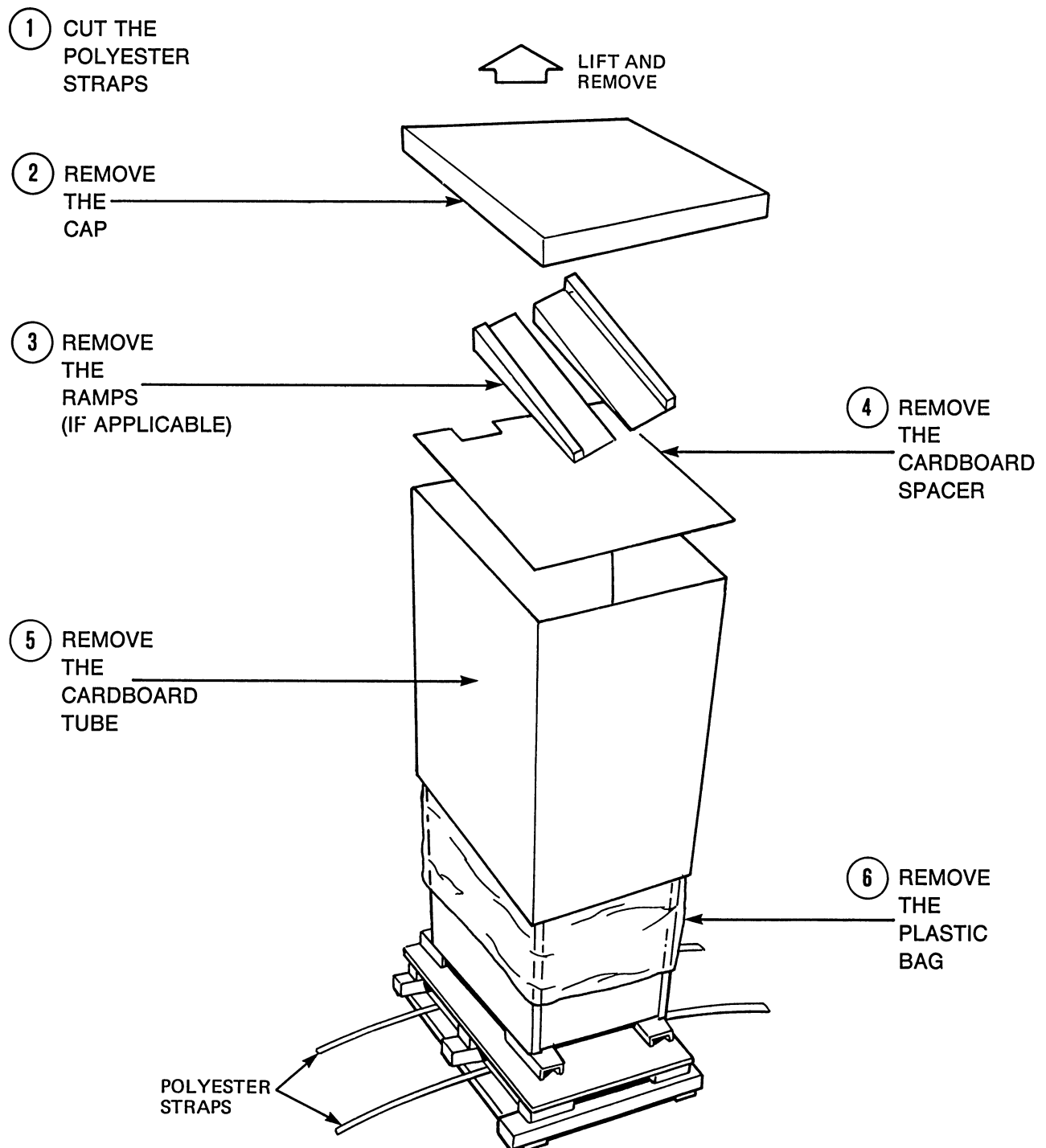
WARNING

EQUIPMENT DESKIDDING IS A TWO-PERSON PROCEDURE. EXERCISE EXTREME CARE TO PREVENT THE CABINET FROM ROLLING UNCONTROLLED DOWN THE RAMPS OR OFF EITHER SIDE OF THE PALLET WHEN RELEASING THE LEVELING FEET. ALL LEVELING FEET MUST BE FULLY RETRACTED BEFORE DESKIDDING.

2. Unpack and deskid the console terminal per the instructions on the shipping container.
3. Inventory the contents against the shipping list.
4. Inspect the equipment and notify the branch manager or supervisor of any missing, incorrect, or damaged items.

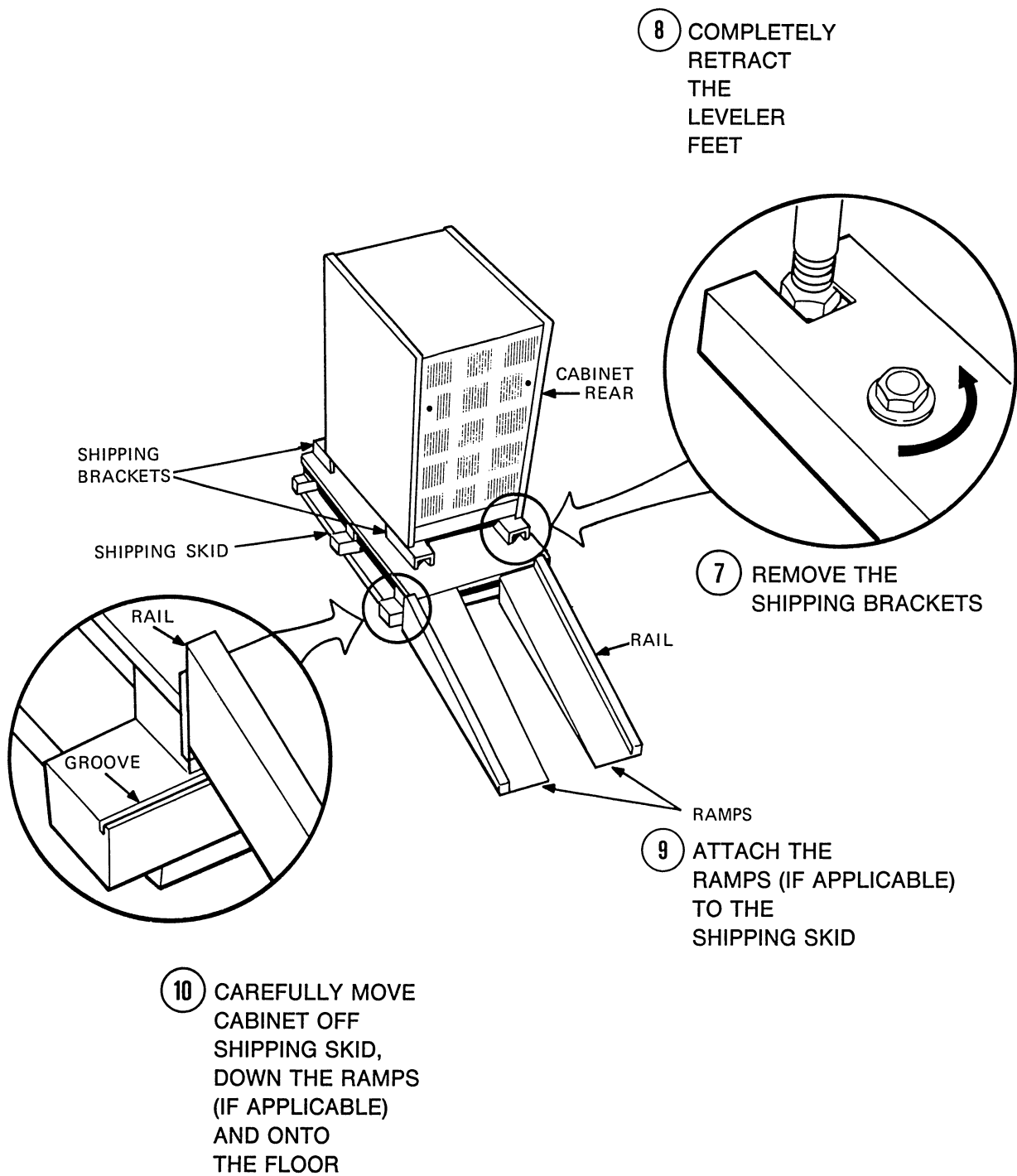
NOTE

Advise the customer to contact the carrier about any missing or damaged items.



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Figure 1-1 Cabinet Unpacking Procedure (Sheet 1 of 2)



MKV84-0626

Figure 1-1 Cabinet Unpacking Procedure (Sheet 2 of 2)

1.2 INSTALLATION

Install the system per the Expanded-System Installation Procedure, Figure 1-2.

- 1 POSITION THE EXPANDER CABINET APPROXIMATELY THREE FEET TO THE LEFT OF THE CPU CABINET.

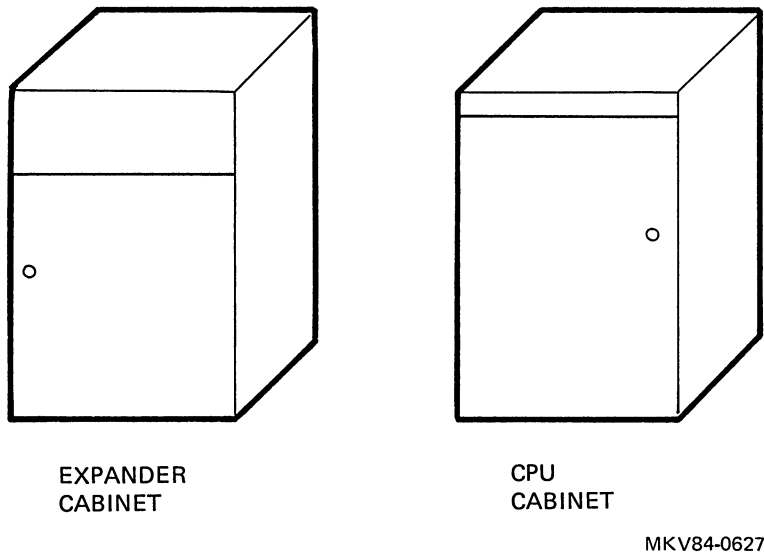


Figure 1-2 Expanded-System Installation Procedure
(Sheet 1 of 23)

- 2 USING A 5/32-INCH HEX WRENCH, UNLATCH THE CPU CABINET FRONT DOOR

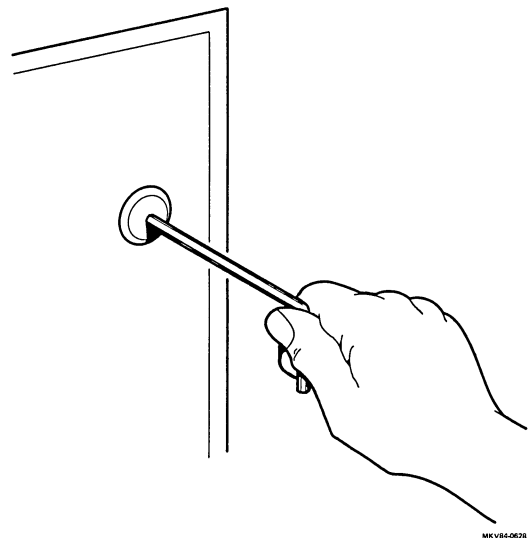
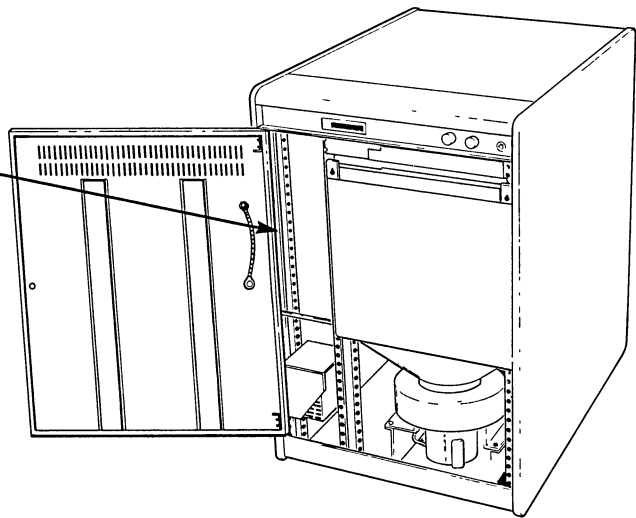


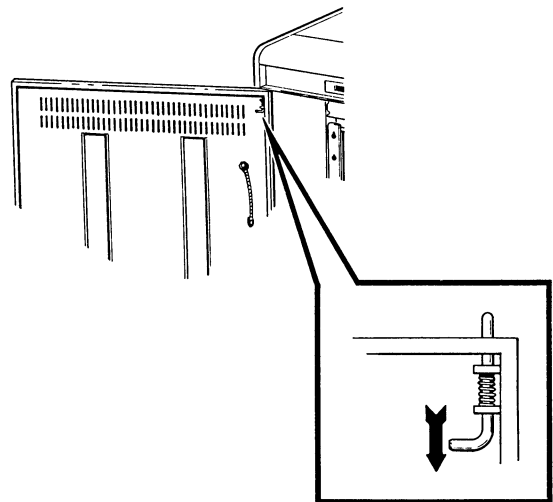
Figure 1-2 Expanded-System Installation Procedure
(Sheet 1 of 20)

- 3 OPEN THE CPU CABINET FRONT DOOR AND DISCONNECT THE GROUND CABLE FROM THE CABINET



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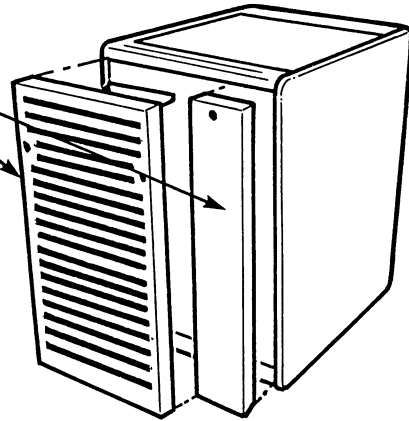
- 4 PULL DOWN ON THE TOP HINGE PIN AND THEN REMOVE THE CPU CABINET DOOR



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Figure 1-2 Expanded-System Installation Procedure
(Sheet 2 of 20)

- 5 USING A HEX WRENCH, UNLATCH AND REMOVE BOTH CPU CABINET BACK COVERS



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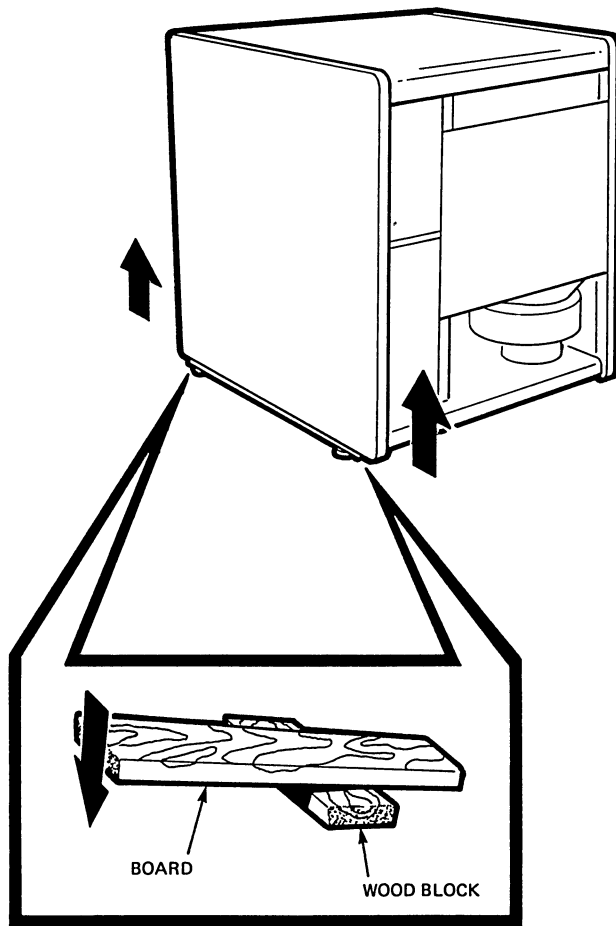
- 6 LOOSEN THE TWO CAPTIVE SCREWS UNDER THE BACK UPPER CROSSMEMBER ON THE CPU CABINET, AND THEN REMOVE THE CABINET TOP COVER
- 7 USING A 5/32-INCH HEX WRENCH, UNLATCH THE EXPANDER CABINET FRONT DOOR
- 8 OPEN THE EXPANDER CABINET FRONT DOOR AND DISCONNECT THE GROUND CABLE FROM THE CABINET
- 9 PULL DOWN ON THE TOP HINGE PIN AND THEN REMOVE THE EXPANDER CABINET DOOR
- 10 USING A 5/32-INCH HEX WRENCH, UNLATCH THE EXPANDER CABINET REAR COVER AND THEN REMOVE IT

Figure 1-2 Expanded-System Installation Procedure
(Sheet 3 of 20)

- 11 REMOVE THE LEFT-SIDE END PANEL FROM THE CPU CABINET USING THE WOOD BLOCKS THAT HAD SECURED THE CABINET TO THE SKID. USING A BOARD AS A LEVER (SEE B), GENTLY PRY THE END PANEL LOOSE (SEE C).

WARNING

THE END PANELS ON THE CABINET ARE TIGHT-FITTING. DO NOT GRASP THE END PANEL FROM THE SIDES TO REMOVE IT (SEE A) BECAUSE YOU MAY BE CUT BY RADIO FREQUENCY (RF) GASKETS MOUNTED INSIDE THE CABINET FRAME RAILS.



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B. LEVER SETUP



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A. WRONG



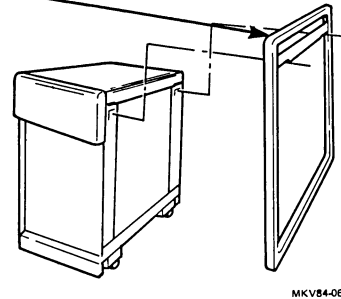
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C. CORRECT

Figure 1-2 Expanded-System Installation Procedure
(Sheet 4 of 20)

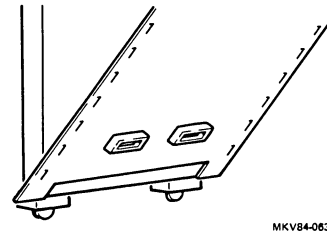
- 12 LIFT AND REMOVE THE RIGHT-SIDE JOINER PANEL FROM THE EXPANDER CABINET

NOTE
OLD JOINER PANEL P/N: H9544-3E
NEW JOINER PANEL P/N: H9544-JA

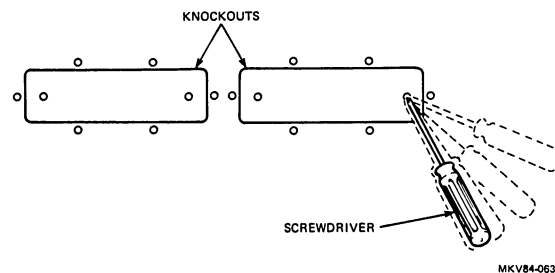


- 13 REMOVE THE SECURING HARDWARE AND THEN THE RIGHT SHIELD END PANEL FROM THE EXPANDER CABINET

NOTE
REMOVE THE SHIELD PANEL WHILE IT IS AT A 45 DEGREE ANGLE TO PREVENT DAMAGE TO THE RF GASKET AT THE LOWER FRONT CORNER OF THE END PANEL.



- 14 INSERT A SCREWDRIVER INTO ONE OF THE TWO HOLES IN ONE KNOCKOUT ON THE END PANEL, AND THEN PRY THE KNOCKOUT FROM THE PANEL



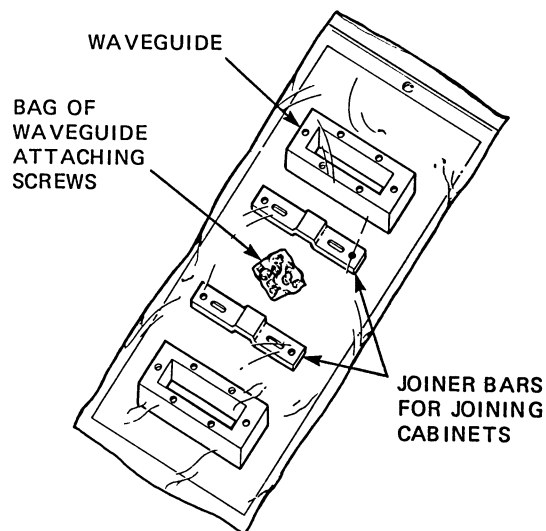
- 15 REPEAT STEP 14 TO REMOVE THE OTHER KNOCKOUT

Figure 1-2 Expanded-System Installation Procedure
(Sheet 5 of 20)

- 16 REMOVE BOTH WAVEGUIDES AND THE ATTACHED SCREWS (30 8-32 1/4 SCREWS) FROM THE WAVEGUIDE/JOINER BAR KIT (PART NO. H9544-JE)

NOTE

SIX OF THE 30 SCREWS ARE SPARES; 12 SCREWS ARE REQUIRED TO SECURE BOTH WAVEGUIDES TO THE EXPANDER CABINET END PANEL, AND 12 SCREWS WILL BE REQUIRED LATER TO SECURE THE CPU CABINET SHIELD PANEL TO BOTH WAVEGUIDES.

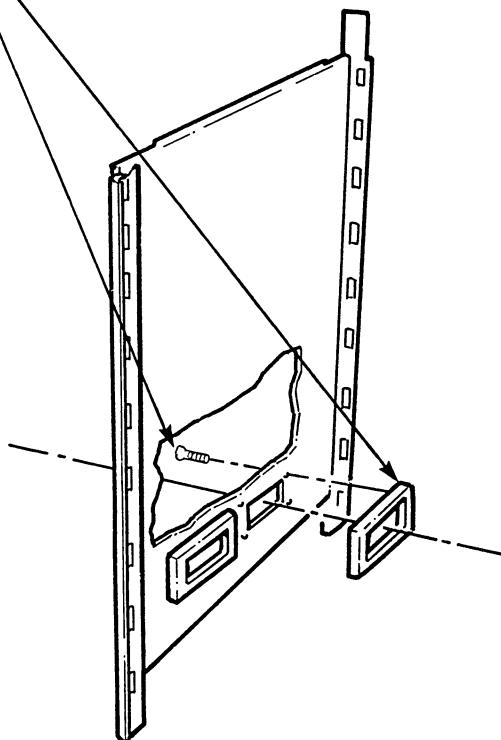


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- 17 INSTALL BOTH WAVEGUIDES IN THE SHIELD PANEL USING SIX 8-32 1/4 SCREWS PER WAVEGUIDE

NOTE

INSTALL THE WAVEGUIDES ONLY ON THE SIDE SHOWN.



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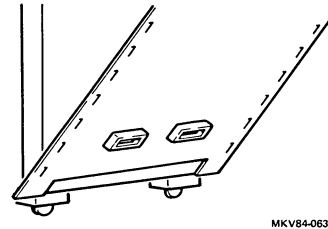
Figure 1-2 Expanded-System Installation Procedure
(Sheet 6 of 20)

- 18 REINSTALL THE SHIELD PANEL ON THE EXPANDER CABINET USING EIGHT SCREWS

NOTE

INITIALLY INSERT THE SHIELD PANEL AT A 45 DEGREE ANGLE TO PREVENT DAMAGE TO THE RF GASKET AT THE LOWER FRONT CORNER OF THE END PANEL.

INITIALLY INSTALL THE SCREWS FINGER-TIGHT; SECURE THEM ONLY AFTER THE SHIELD PANEL HAS BEEN ALIGNED ON THE SIDE OF THE EXPANDER CABINET.



- 19 REMOVE SIX SCREWS AND THE SHIELD PANEL FROM THE LEFT SIDE OF THE CPU CABINET
- 20 INSERT A SCREWDRIVER INTO ONE OF THE TWO HOLES IN ONE KNOCKOUT ON THE CPU CABINET SHIELD PANEL AND PRY THE KNOCKOUT OUT OF THE PANEL
- 21 REPEAT STEP 20 TO REMOVE THE OTHER KNOCKOUT FROM THE SHIELD PANEL
- 22 REINSTALL THE SHIELD PANEL ON THE CPU CABINET AND SECURE IT WITH SIX SCREWS
- 23 LOOSELY INSTALL THE JOINER PANEL (REMOVED FROM THE EXPANDER CABINET) ON THE LEFT SIDE OF THE CPU CABINET
- 24 INSTALL INTERCABINET CABLING (ONLY IF SYSTEM EXPANSION IS TO THE RIGHT)

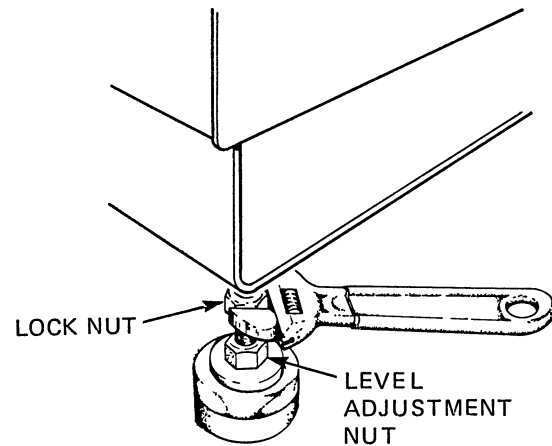
Figure 1-2 Expanded-System Installation Procedure
(Sheet 7 of 20)

- 25 RAISE THE JOINER PANEL ON THE LEFT SIDE OF THE CPU CABINET APPROXIMATELY ONE INCH

- 26 MOVE THE CABINETS TOGETHER

CAUTION
MONITOR THE INTERCABINET CABLING AS THE CABINETS ARE MOVED TOGETHER TO PREVENT DAMAGE TO THEM.

- 27 ADJUST THE LEVELER FEET, AS NECESSARY, ON BOTH CABINETS TO OBTAIN ALIGNMENT OF THE WAVEGUIDES AND THE TWO KNOCKOUT HOLES IN THE CPU CABINET SHIELD PANEL



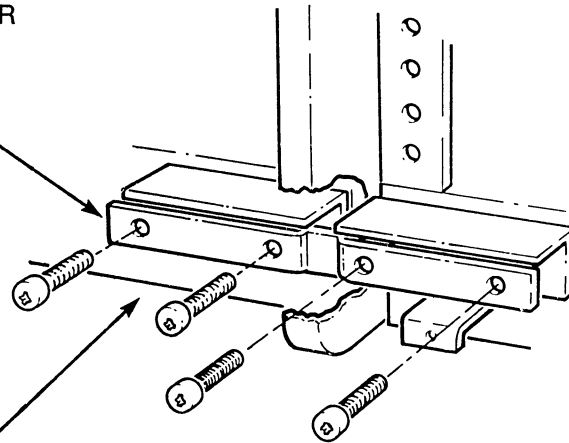
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- 28 PUSH DOWN ON THE JOINER PANEL UNTIL IT IS FLUSH WITH BOTH CABINETS

- 29 SECURE THE TWO WAVEGUIDES TO THE SHIELD PANEL FROM INSIDE THE CPU CABINET WITH 12 8-32 1/4 SCREWS

- 30 REMOVE THE TWO JOINER BARS FROM THE WAVEGUIDE/JOINER BAR PACKAGE

- 31 INSTALL A JOINER BAR AT THE LOWER FRONT OF THE TWO CABINETS

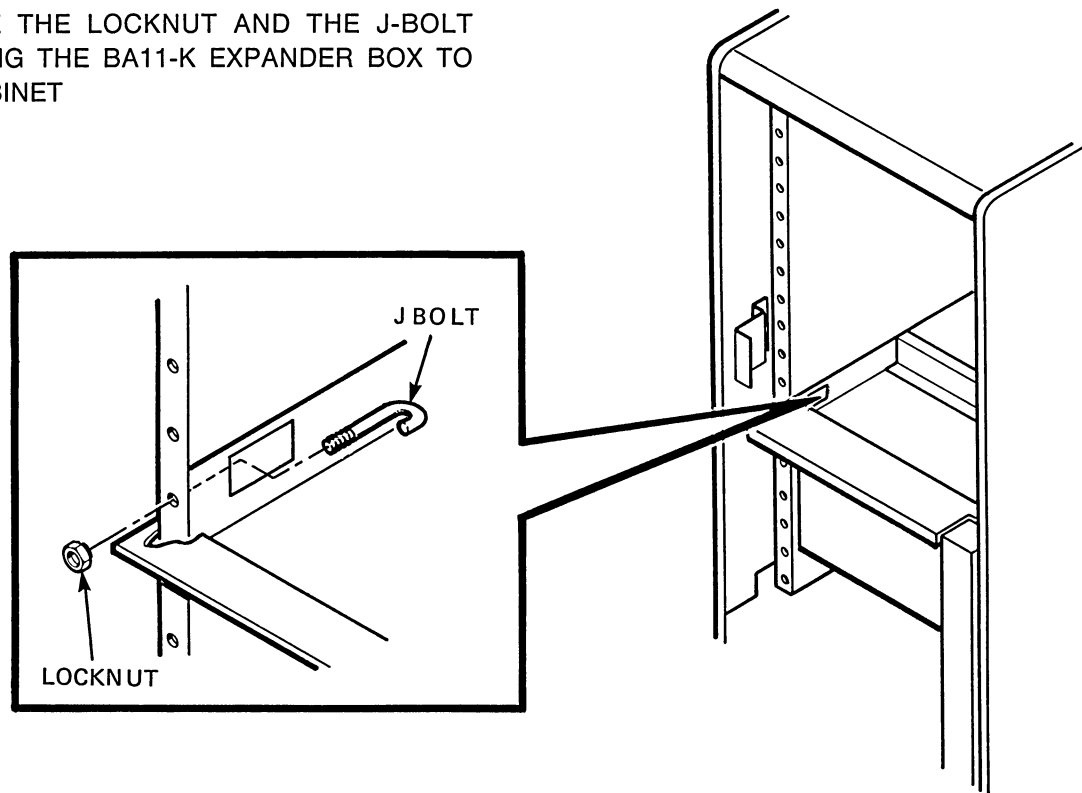


- 32 INSTALL A JOINER BAR AT THE LOWER BACK OF THE TWO CABINETS

Figure 1-2 Expanded-System Installation Procedure
(Sheet 8 of 20)

- 33 PULL OUT THE EXPANDER CABINET STABILIZER BAR TO THE MAXIMUM-EXTENDED POSITION

- 34 REMOVE THE LOCKNUT AND THE J-BOLT SECURING THE BA11-K EXPANDER BOX TO THE CABINET



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- 35 PULL OUT THE BA11-K TO THE MAXIMUM-EXTENDED (SERVICE) POSITION

- 36 REMOVE THE BA11-K TOP COVER

- 37 REMOVE THE CABLE COVER BAR FROM ATOP THE BA11-K

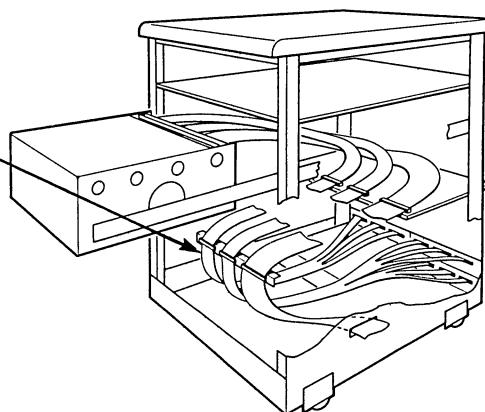
Figure 1-2 Expanded-System Installation Procedure
(Sheet 9 of 20)

38 INSTALL CABLING

BA11-K
EXPANDER
BOX

COMM
CABLES

UNIBUS
CABLES



MKV84-0801

39 REINSTALL THE CABLE COVER BAR ATOP THE BA11-K EXPANDER BOX

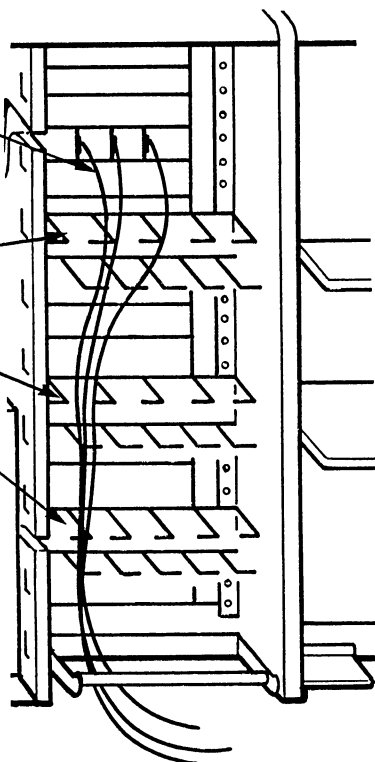
40 REINSTALL THE BA11-K TOP COVER

41 PUSH THE BA11-K BACK INTO THE EXPANDER CABINET

42 SECURE THE BA11-K BOX TO THE CABINET WITH THE J-BOLT AND LOCKNUT

43 INSTALL UNIBUS OPTIONS CABLES

44 ROUTE THE CABLES THROUGH THE CABLE GUIDES

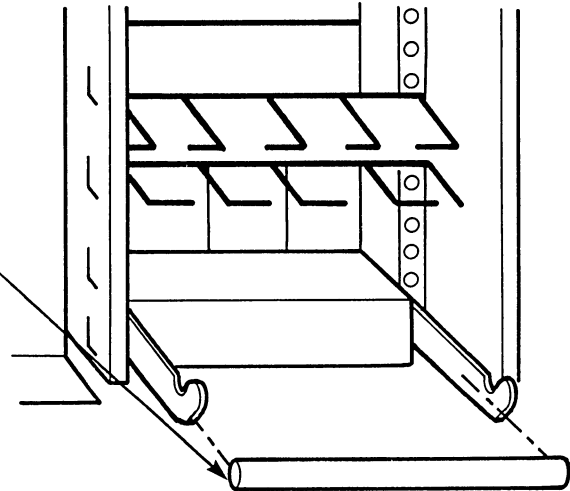


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Figure 1-2 Expanded-System Installation Procedure
(Sheet 10 of 20)

- 45 IF MASSBUS DEVICES ARE TO BE CONNECTED TO THE CPU CABINET PERFORM STEPS 46 THROUGH 48; OTHERWISE, PROCEED DIRECTLY TO STEP 49

- 46 REMOVE THE ROLL BAR FROM THE LOWER BACK OF THE CPU CABINET

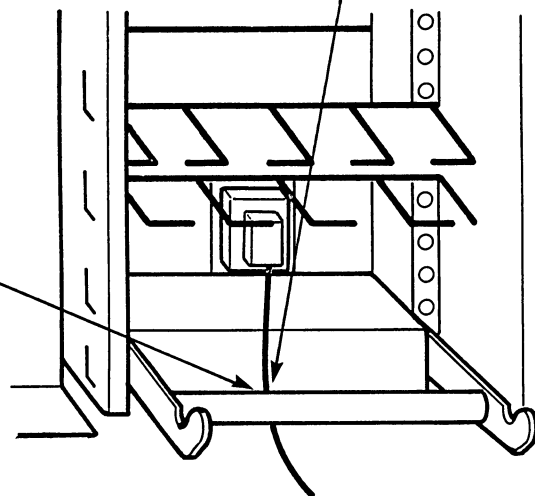


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- 47 INSTALL THE SHIELDED MASSBUS CABLES FROM THE DEVICES ON THE SYSTEM TO THE CPU CABINET I/O BULKHEAD, IF APPLICABLE

NOTE
READ THE OPTIONS EXTERNAL CABLE CONNECTION INSTRUCTIONS IN CHAPTER 4, COMMUNICATION OPTIONS INSTALLATION, IF APPLICABLE.

- 48 REINSTALL THE ROLL BAR

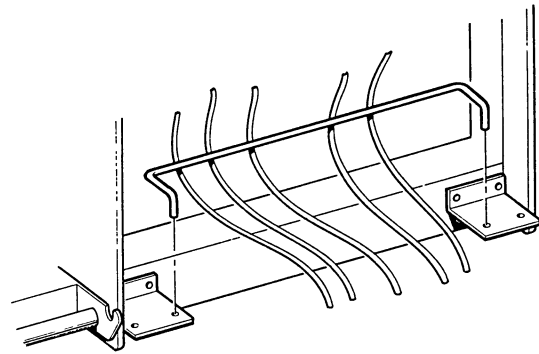


MKV84-0804

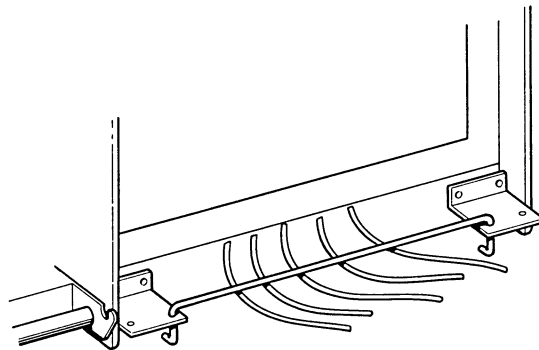
Figure 1-2 Expanded-System Installation Procedure
(Sheet 11 of 20)

49 UNTAPE THE CABLE MANAGEMENT BAR FROM INSIDE THE EXPANDER CABINET BACK COVER

50 POSITION THE CABLE MANAGEMENT BAR AT THE LOWER BACK OF THE EXPANDER CABINET WITH THE ENDS OF THE BAR POINTING DOWNWARD



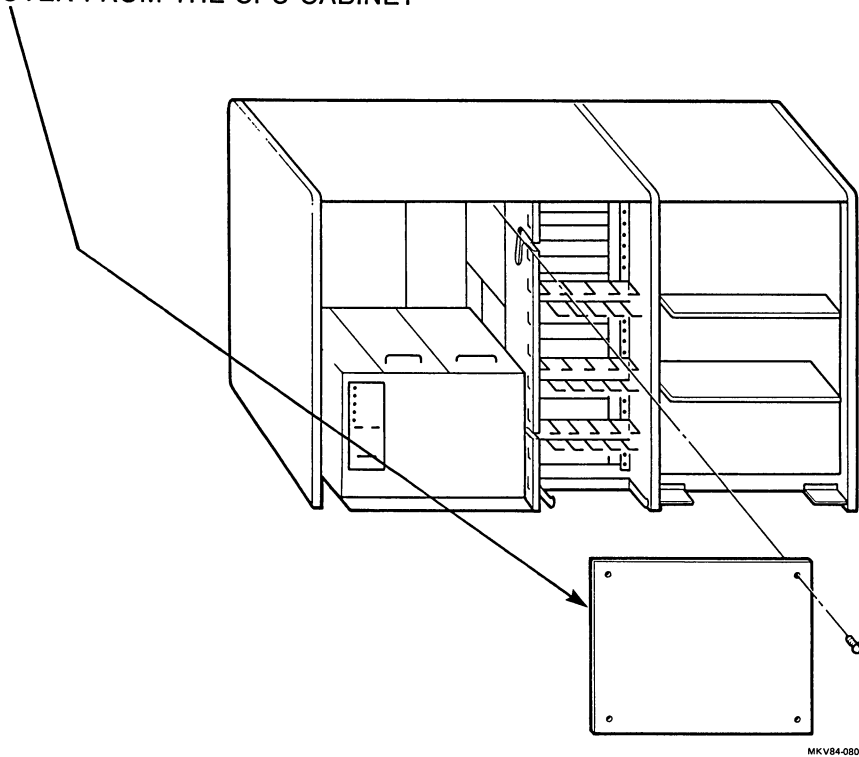
51 INSERT THE ENDS OF CABLE MANAGEMENT BAR INTO THE HOLES IN TWO BACK-PANEL MOUNTING BRACKETS, AND THEN ROTATE THE BAR SO THAT THE ENDS POINT HORIZONTALLY TOWARDS THE CABINET



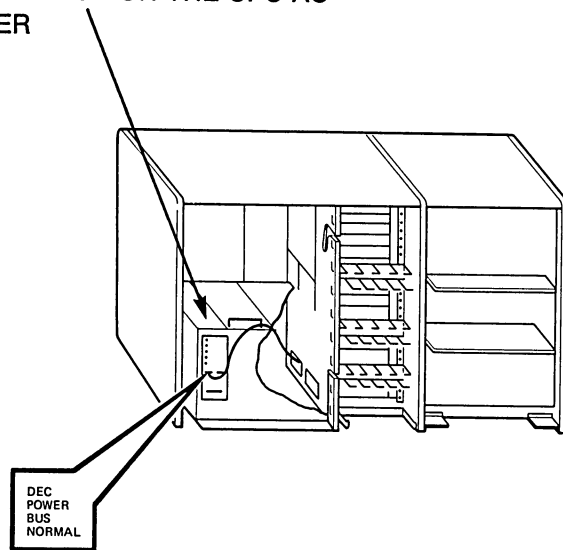
MKV84 0805

Figure 1-2 Expanded-System Installation Procedure
(Sheet 12 of 20)

- 52 REMOVE FOUR SCREWS AND THE BACK-PLANE COVER FROM THE CPU CABINET



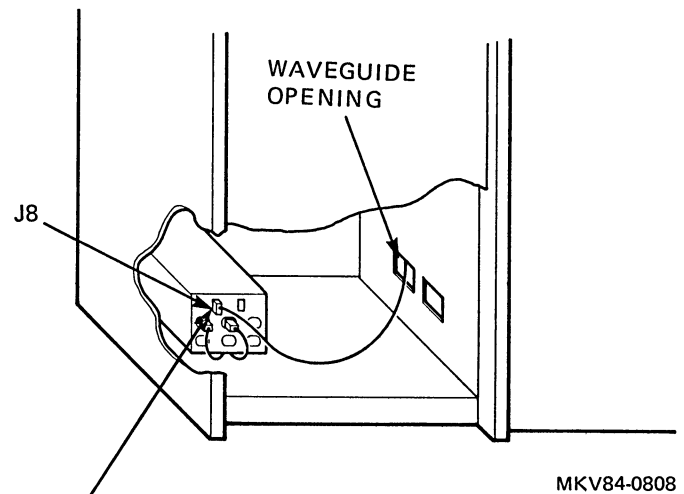
- 53 CONNECT THE PLUG AT ONE END OF THE POWER CONTROL BUS CABLE TO THE NORMAL DEC POWER BUS JACK ON THE CPU AC POWER CONTROLLER



MKV84-0807

Figure 1-2 Expanded-System Installation Procedure
(Sheet 13 of 20)

- 54 ROUTE THE OTHER END OF THE POWER CONTROL BUS CABLE OVER THE CPU POWER SUPPLIES AND THEN DOWN THROUGH ONE OF THE TWO WAVEGUIDES AND INTO THE EXPANDER CABINET



- 55 CONNECT THE POWER CONTROL BUS CABLE TO POWER CONTROL BUS JACK J8 ON THE EXPANDER CABINET AC POWER CONTROLLER

Figure 1-2 Expanded-System Installation Procedure
(Sheet 14 of 20)

56 REFER TO THE INTERNAL WIRING DIAGRAM (BELOW) TO SOLVE ANY CABLE CONNECTION PROBLEMS IN THE CPU CABINET

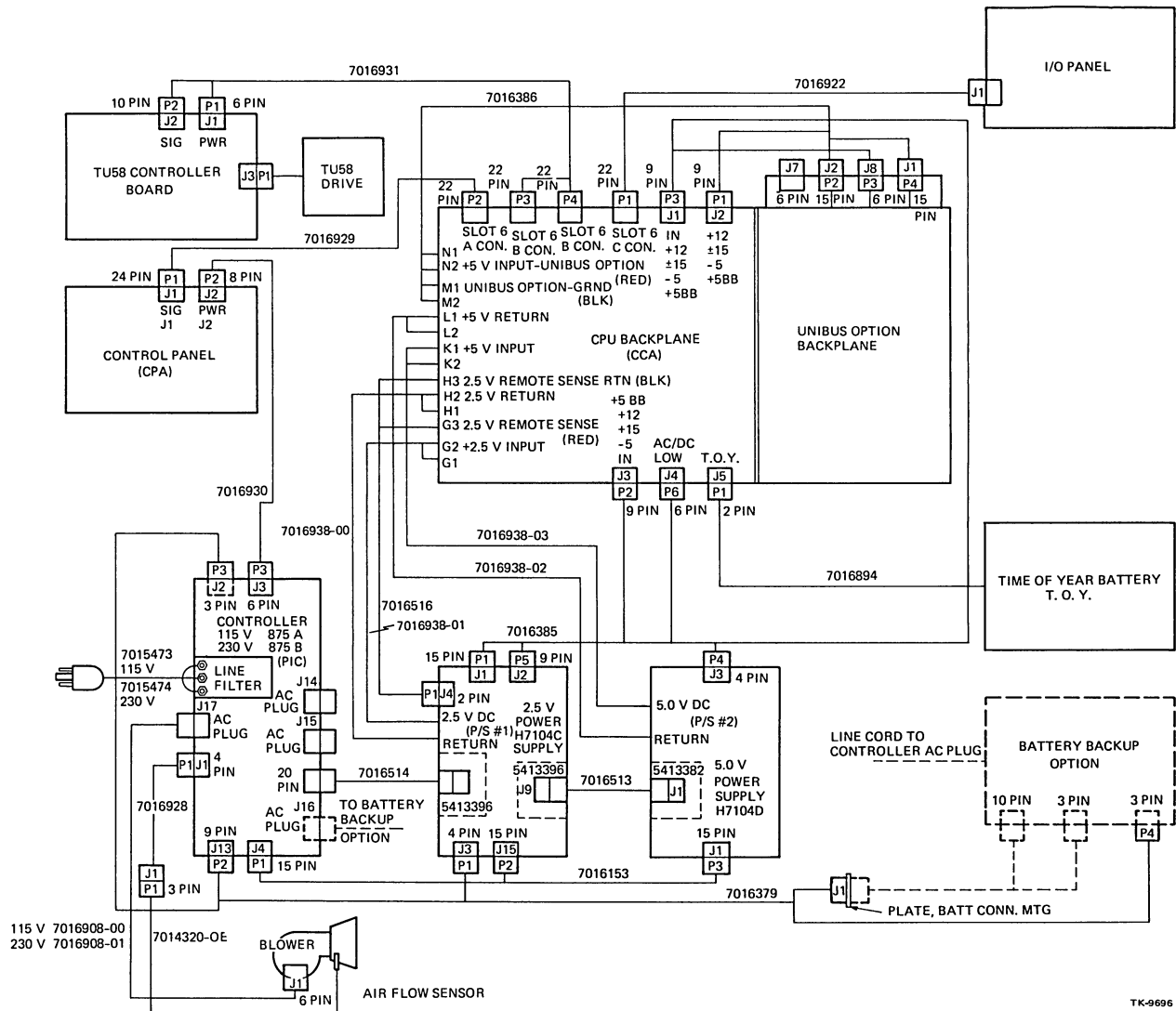
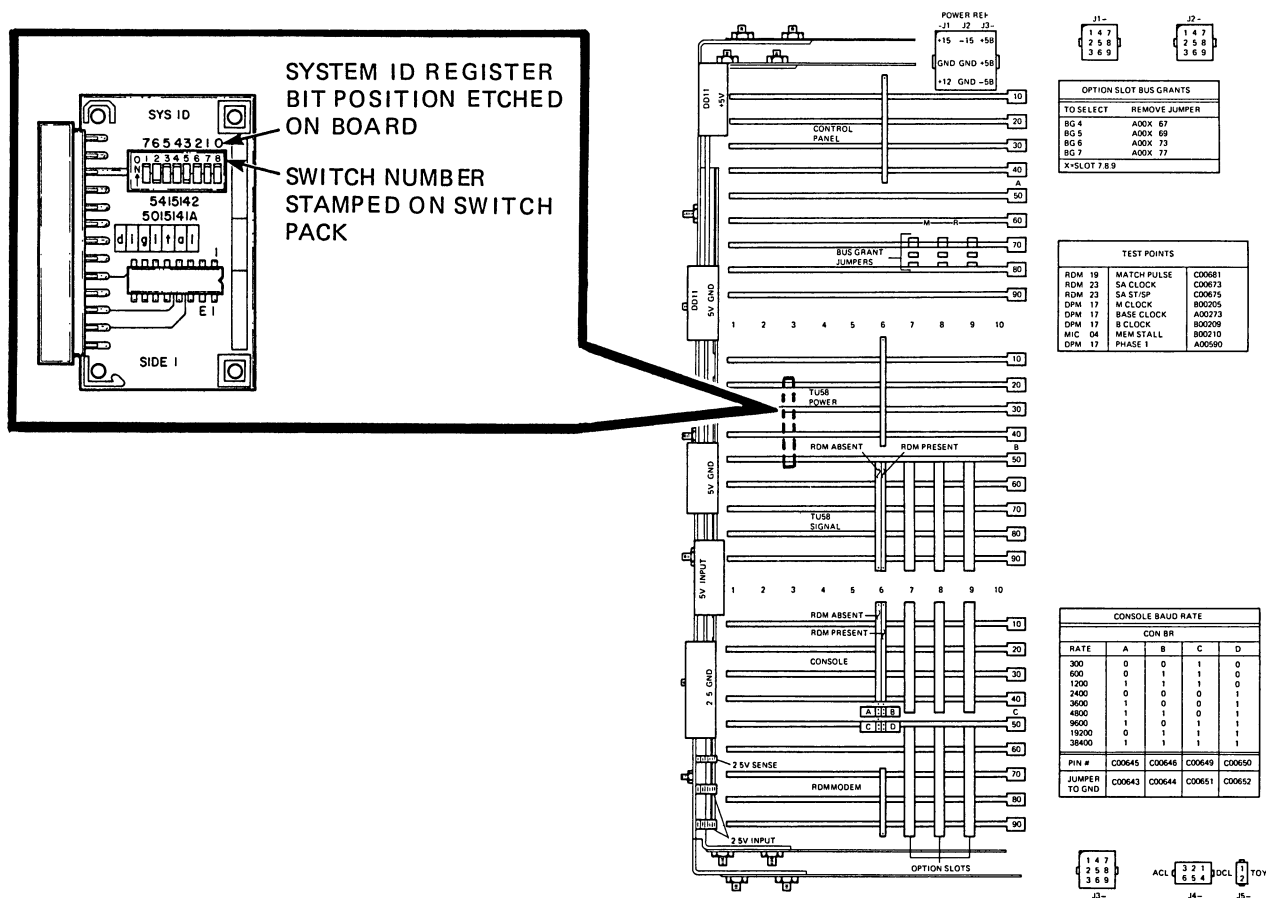


Figure 1-2 Expanded-System Installation Procedure
(Sheet 15 of 20)

- 57 CHECK THAT THE SID SWITCHPACK MODULE HAS BEEN INSTALLED IN BACKPLANE CONNECTOR HOUSING SLOT 4, POSITIONS 400B19/20 TO 400B57/58, WITH THE SWITCHPACK FACING SLOT 3

NOTE

USE THE SYSTEM ID REGISTER BIT POSITIONS ETCHED ON THE BOARD TO SET THE SWITCHES. IGNORE THE NUMBERS STAMPED ON THE SWITCHPACK.



VAX-11/750 BACKPLANE DECAL

MKV84-0833

Figure 1-2 Expanded-System Installation Procedure
(Sheet 16 of 20)

58 CHECK THE CPU CONSOLE BAUD RATE JUMPER CONFIGURATION ON THE BACKPLANE

NOTE

THE CONSOLE BAUD RATE IS SET TO 300 DURING SYSTEM MANUFACTURE. TO SELECT A DIFFERENT BAUD RATE, CHANGE THE JUMPER CONFIGURATION ON BACKPLANE SLOT 6, CONNECTOR C, AS INDICATED ON THE BACKPLANE COVER DECAL.

59 CHECK THE CMI OPTION SLOT JUMPER CONFIGURATION

NOTE

ANY VACANT CMI OPTION SLOT MUST HAVE FOUR BUS GRANT (BG) CONTINUITY JUMPER PLUGS INSTALLED. VERIFY THIS BY CHECKING PER THE BACKPLANE DECAL AND ALSO PER THE FOLLOWING TABLE.

Bus Grant	Jumpered Pins
BG4	A-67 TO A-68
BG5	A-69 TO A-70
BG6	A-73 TO A-74
BG7	A-77 TO A-78

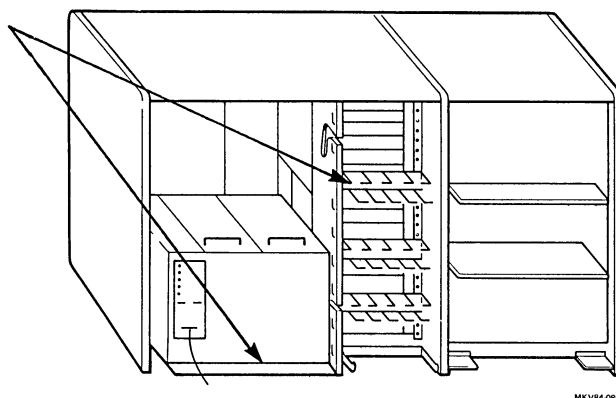
NOTE

ANY OPTION SLOT WHICH HAS AN OPTION MODULE INSTALLED MUST HAVE THE FOUR JUMPERS LISTED IN THE ABOVE TABLE.

60 REINSTALL THE CPU CABINET BACKPLANE COVER AND SECURE IT WITH FOUR SCREWS

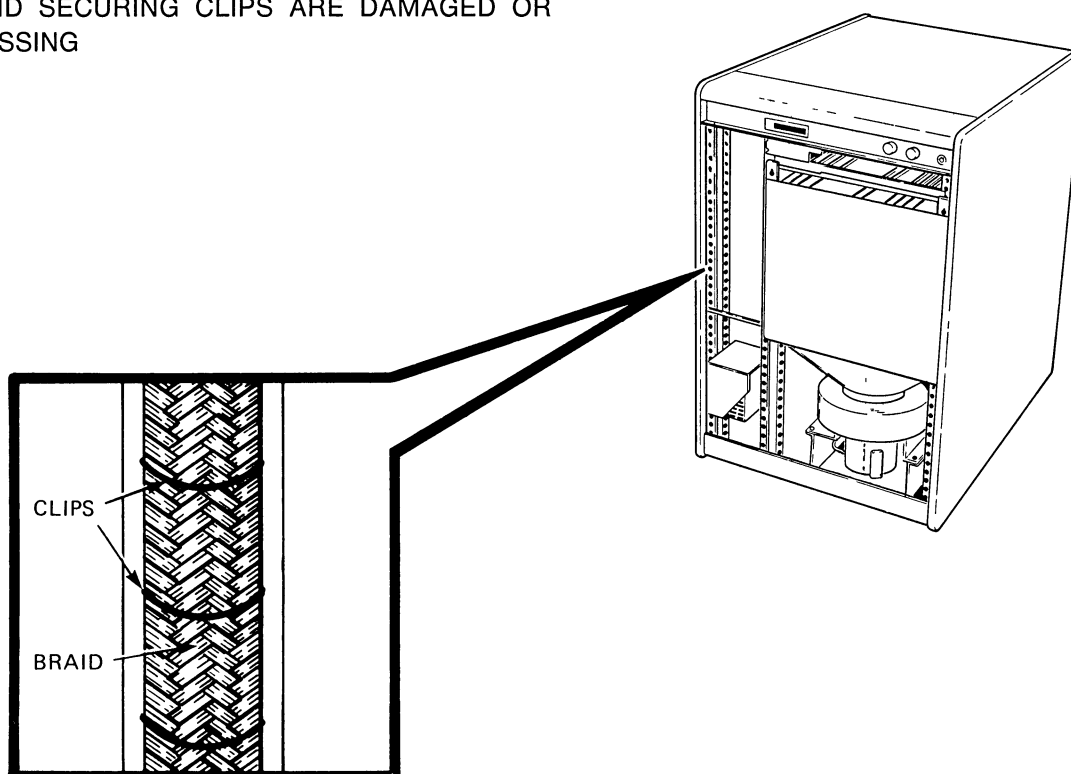
Figure 1-2 Expanded-System Installation Procedure
(Sheet 17 of 20)

- 61 CHECK THAT ALL FLEXIBLE SPRING-STRIP TYPE RF GASKETS ARE PRESENT IN ALL MOUNTING HOLES PROVIDED FOR THEM AND THAT ALL OF THE FLEXIBLE SPRING-STRIP GASKETS APPEAR TO BE OF SIMILAR SHAPE (THAT IS, NONE ARE MISSHAPED)



MKV84-0809

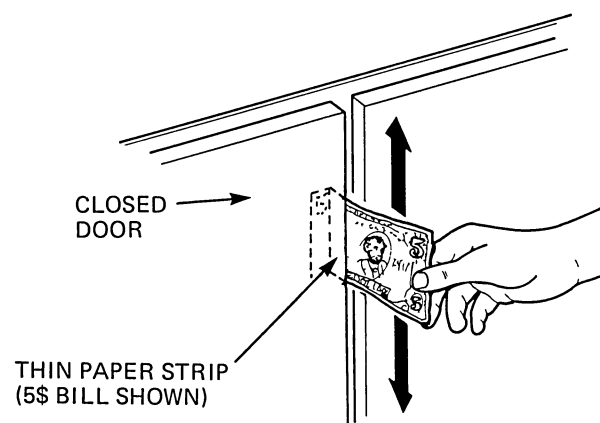
- 62 CHECK THAT NO BRAIDED RFI SHIELDING AND SECURING CLIPS ARE DAMAGED OR MISSING



MKV84-0810

Figure 1-2 Expanded-System Installation Procedure
(Sheet 18 of 20)

- 63 REINSTALL ONE OF THE CPU CABINET BACK COVERS AND THEN LATCH IT, USING A 5/32-INCH HEX WRENCH AND THEN REINSTALL AND LATCH THE OTHER CPU CABINET BACK COVER
- 64 REINSTALL THE CPU CABINET TOP COVER AND SECURE IT WITH THE ATTACHING HARDWARE
- 65 REINSTALL AND THEN LATCH (USING A HEX WRENCH) THE BACK COVER ON THE EXPANDER CABINET
- 66 REINSTALL THE EXPANDER CABINET FRONT DOOR AND THEN RECONNECT THE DOOR GROUND CABLE TO THE CABINET
- 67 LATCH THE EXPANDER CABINET FRONT DOOR, USING A 5/32-INCH HEX WRENCH
- 68 REINSTALL THE CPU CABINET FRONT DOOR AND THEN RECONNECT THE DOOR GROUND CABLE TO THE CABINET
- 69 LATCH THE CPU CABINET FRONT DOOR
- 70 CHECK DOOR/COVER-TO-CABINET RF SEAL CONTINUITY BY INSERTING A THIN STRIP OF PAPER BETWEEN THE DOOR/COVER-TO-CABINET SEAM AND CHECKING FOR RESISTANCE AS THE PAPER STRIP IS MOVED ALONG THE SEAM. IF THERE IS NO RESISTANCE THE DOOR/COVER-TO-CABINET SEAM WILL NOT PROVIDE AN EFFECTIVE RF SEAL DURING EQUIPMENT OPERATION AND, THEREFORE, MUST BE ADJUSTED UNTIL A PROPER RF SEAL IS ATTAINED



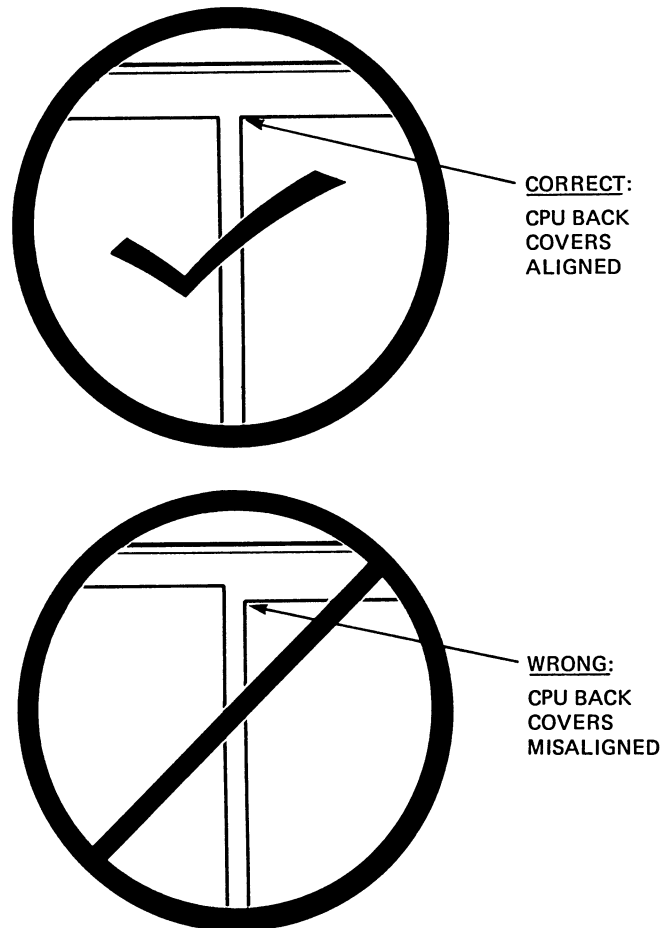
MKV84-0811

Figure 1-2 Expanded-System Installation Procedure
(Sheet 19 of 20)

- 71 CHECK THAT THE EQUIPMENT DOORS AND COVERS ARE ALIGNED ON THE CABINETS, AND ADJUST LEVELER FEET AS NECESSARY TO ACHIEVE PROPER ALIGNMENT

NOTE

DOOR MUST BE PROPERLY ALIGNED ON CABINETS SO THAT RFI SUPPRESSION FEATURES OF CABINETS WILL REMAIN VALID.



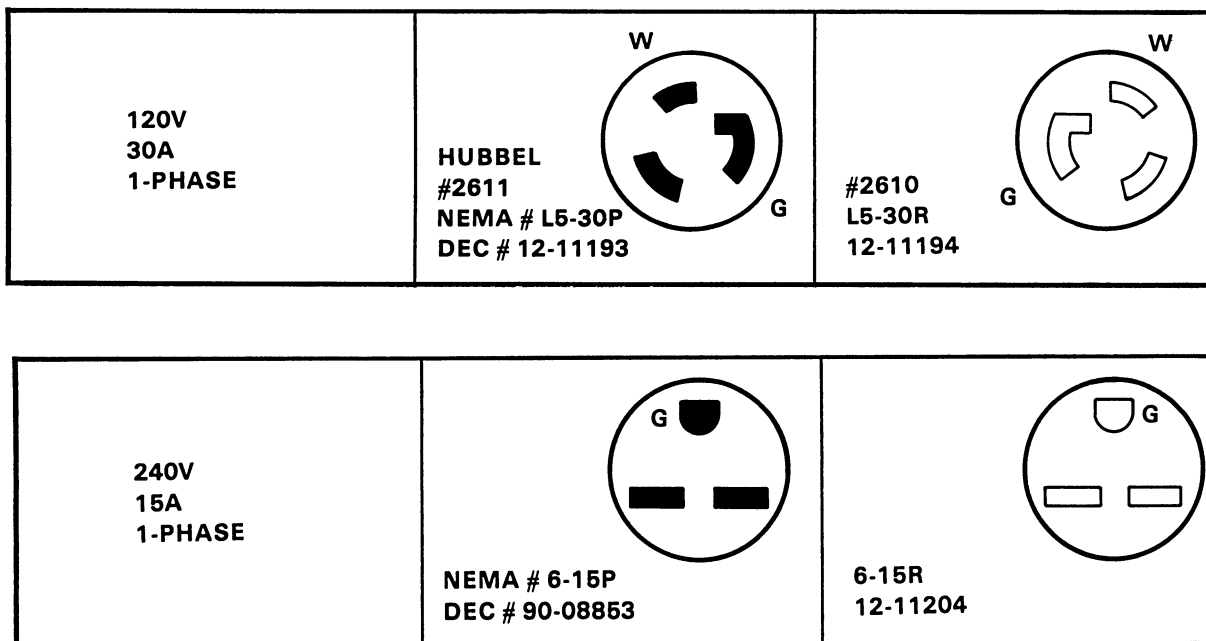
MKV84-0812

Figure 1-2 Expanded-System Installation Procedure
(Sheet 20 of 20)

1.3 POWER CHECK

Figure 1-3 illustrates various ac power receptacles and plugs. The CPU cabinet and the expander cabinet (if present) require single-phase ac power.

Measure the voltage between the source and neutral lines on the single-phase power source receptacles and also to ground and between earth ground and neutral (8 volts maximum).



MKV84-0813

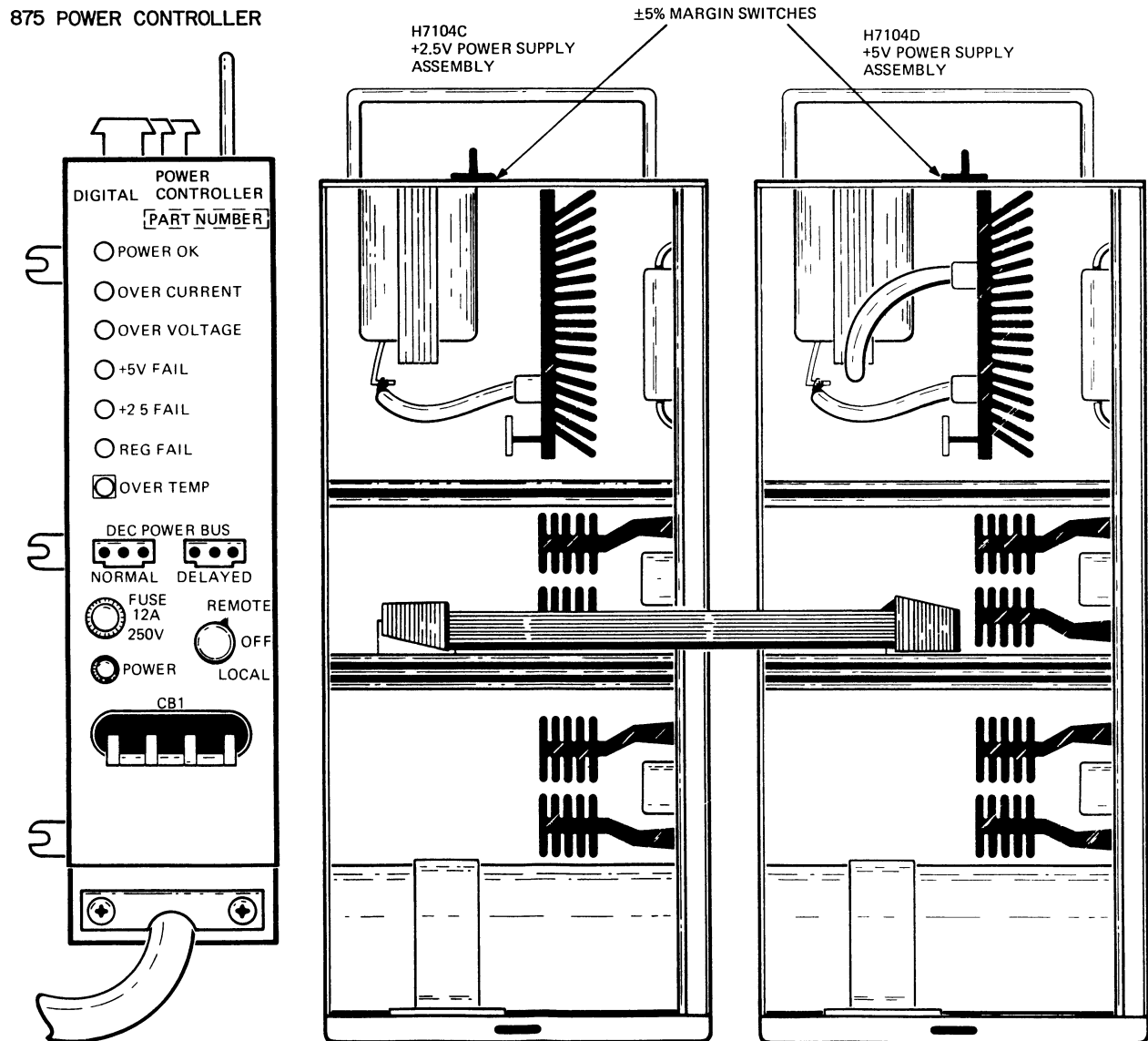
Figure 1-3 Power Plugs and Receptacles

CHAPTER 2

SYSTEM CHECKOUT AND ACCEPTANCE PROCEDURE

2.1 CONTROLS AND INDICATORS

Figure 2-1 illustrates the CPU ac power controller panel controls and indicators. Figure 2-2 illustrates the CPU console panel controls and indicators.



TK-6432

Figure 2-1 CPU AC Power Controller Panel Controls and Indicator

2.1.1 CPU AC Power Controller Panel Controls and Indicators

Table 2-1 lists and describes the CPU ac power controller panel controls and indicators that are illustrated on Figure 2-1.

Table 2-1 CPU AC Power Controller Panel Controls and Indicators

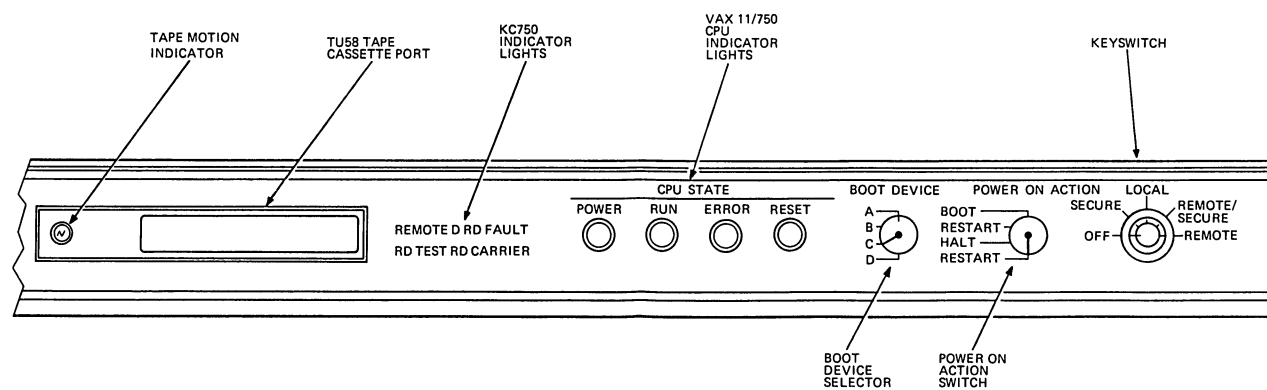
Control or Indicator (Figure 2-1)	Description
POWER OK indicator	When the power supply system is functioning correctly, the green DC OK indicator is on. This indicator is never on if any power supply system fault indicator is on.
OVER CURRENT indicator	Whenever the red overcurrent indicator is on, there is an overcurrent condition in either the +2.5 V or +5 V power supply. The fail indicator of the affected power supply will be on.
OVER VOLTAGE indicator	Whenever the red overvoltage indicator is on, there is an overvoltage condition in either the +2.5 V or +5 V power supply. The fail indicator of the affected power supply will be on.
+5 V FAIL indicator	The red +5 V fail indicator is lit when there is a malfunction in the +5 V power supply.
+2.5 V FAIL indicator	The red +2.5 V fail indicator is lit when there is a malfunction in the +2.5 V power supply.
REG FAIL indicator	The red reg fail indicator is lit when the +5 V, +12 V, or +15 V regulators are malfunctioning.
OVER TEMP indicator	The over temp indicator is lit when there is an overtemperature condition in either the +5 V or the +2.5 V power supply.
DEC POWER BUS connectors	There are two DIGITAL power bus connectors: NORMAL and DELAYED. These connectors provide a POWER UP REQUEST signal that can be interconnected between the H875 power system and remote power systems. There is a half-second delay on the delayed DIGITAL power bus connector's output (J9).

Table 2-1 CPU AC Power Controller Panel Controls and Indicators (Cont)

Control or Indicator (Figure 2-1)	Description
REMOTE/OFF/LOCAL Switch	
REMOTE positions	In the remote position, the external ac voltage is applied to the power supply system by the keyswitch on the CPU's front panel.
OFF position	No external ac power is applied to the powersupply system.
LOCAL position	The external ac power is applied to the power supply system regardless of the keyswitch position on the CPU's front panel.
POWER indicator	The power indicator is lit whenever the external ac voltage is applied to the power supply system, even if CB1 is off.
CB1 circuit breaker	Main circuit breaker that applies the external ac power to the power supply system.

2.1.2 CPU Front Control Panel Controls and Indicators

Table 2-2 lists and describes the CPU front panel control panel controls and indicators that are illustrated on Figure 2-2.



TK 9873

Figure 2-2 CPU Console Panel Controls and Indicators

**Table 2-2 CPU Front Control Panel Controls
and Indicators**

Control or Indicator (Figure 2-2)	Description
Tape Motion indicator	Indicates continually during a tape search or rewind operation. Indicates intermittently when a tape is read or written to.
KC750 Remote Diagnostic indicator lights	Four back-lit indicators that are functional only on systems that contain an optional remote diagnostic module installed by Field Service.
REMOTE D indicator	Indicates when the power key switch is set to the REMOTE or the REMOTE SECURE position.
RD FAULT indicator	Indicates a Remote Diagnostic Module (RDM) failure. Indicates for approximately 10 seconds during console power-up as part of a logic self-test.
RD TEST indicator	Indicates when the DDC host computer is performing RD tests.
RD CARRIER indicator	Indicates when a carrier signal is detected from DDC.
CPU STATE Indicators or Switch	
POWER indicator	Green light that indicates when DC power is applied to the CPU and that the KEYLOCK switch is not in the OFF position.
RUN* indicator	Green light that indicates that the CPU is in the RUN state.

**Table 2-2 CPU Front Control Panel Controls
and Indicators (Cont)**

Control or Indicator (Figure 2-2)	Description
ERROR* indicator	Red light that indicates when the CPU has stopped because of an unrecoverable control store parity error.
RESET pushbutton switch	Pushbutton initialize switch used to activate a false CPU down/power up sequence. First micro verify is performed, and then the system comes up in the state selected by the POWER ON ACTION switch. Initialize is disabled in either of the secure positions.
BOOT DEVICE Switch	Four-position rotary switch used to select a bootstrap ROM to boot a specific device. The VAX-11/750 memory controller contains four sockets for built-in, read-only memory chips that contain the VAX-11/750 code required to bootstrap a specific device. The BOOT DEVICE switch selects which one of the four ROMs is to provide the bootstrap code for an initiated boot sequence.
POWER ON ACTION Switch	Four-position rotary switch used to determine the CPU action on power up and initialize.
BOOT position	The CPU bootstraps from the device selected by the BOOT DEVICE switch.
RESTART/(Boot) position	If the memory contents have been maintained by the battery backup unit, a restart is attempted; otherwise, a bootstrap sequence occurs.
HALT position	The CPU comes up in the halted state in the console I/O mode.
RESTART (Halt) position	If the memory contents have been maintained by the battery backup unit, a restart sequence is attempted; otherwise, the CPU halts.

**Table 2-2 CPU Front Control Panel Controls
and Indicators (Cont)**

Control or Indicator (Figure 2-2)	Description
FIVE-POSITION KEYLOCK Switch	
OFF	No power to the CPU, except for the time-of-year clock.
SECURE	Console mode activation (control P) is disabled. The optional remote diagnostics line is completely disabled, as is the INITIALIZE button.
LOCAL	The CPU responds to console commands, and the optional remote diagnostic line is completely disabled.
REMOTE/SECURE	The remote line replaces the local console terminal, and console mode activation and RDM diagnostic mode activation are inhibited. The remote line may place the local console terminal in the "talk" mode.
REMOTE	Only the remote line can activate the console functions, however, the remote line has the capability to relinquish control to the local terminal.

*These indicators are not meaningful during microdiagnostics.

2.2 INITIAL POWER TURN-ON PROCEDURE

The following procedure describes how to turn on the system after it has been installed or after it has been completely shut down for maintenance.

1. Check that circuit breaker CB1 (Figure 2-1) on the CPU ac power controller panel has been set to OFF position (down).
2. Verify that the two +5 percent margin switches on the power supply are in the straight up, center position.
3. Set the CPU console keyswitch (Figure 2-2) to the OFF position.
4. Set the REMOTE/OFF/LOCAL switch (Figure 2-2) on the CPU ac power controller panel to the REMOTE position.
5. Connect the ac power cable to the appropriate outlet.

NOTE

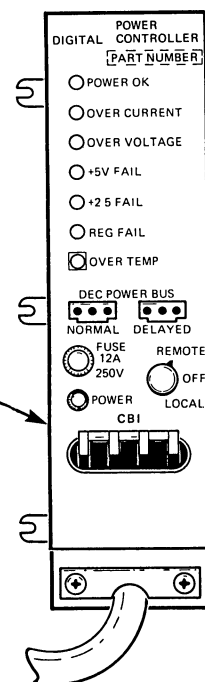
The POWER phase indicator on the CPU ac power controller should now be on.

6. Set circuit breaker CB1 on the CPU ac power controller panel (Figure 2-1) to the ON (up) position.
7. Set the CPU console keyswitch (Figure 2-2) to LOCAL.

2.3 NORMAL TURN-ON/TURN-OFF PROCEDURE

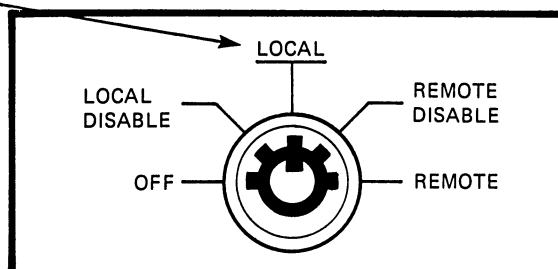
Figure 2-3 illustrates the normal system turn-on procedure. Figure 2-4 illustrates the normal system turn-off procedure.

- ① AT THE REAR OF THE CPU CABINET, SET CIRCUIT BREAKER CB1 TO ON (UP)



MKV84-0815

- ② SET THE CPU CONSOLE KEYSWITCH TO LOCAL



MKV84-0816

- ③ AT THE CONSOLE TERMINAL A CONSOLE PROMPT SHOULD BE PRINTED INDICATING THAT THE SYSTEM IS READY

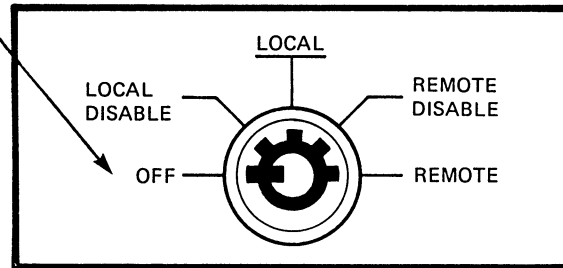
>>>

Figure 2-3 System Turn-On Procedure

- 1 SHUT DOWN THE SYSTEM AT THE CONSOLE TERMINAL BY EXECUTING THE SHUTDOWN COMMAND PROCEDURE

EXAMPLE: `$@SYS$SYSTEM:SHUTDOWN`

- 2 SET THE CPU CONSOLE KEYSWITCH TO OFF



MKV84-0817

- 3 AT THE REAR OF THE CPU CABINET, SET CIRCUIT BREAKER CB1 TO OFF (DOWN)

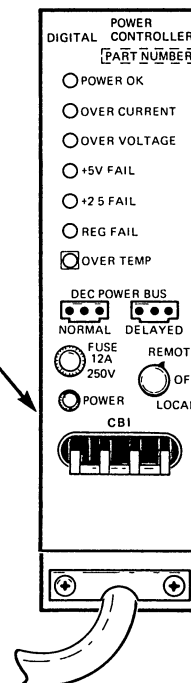


Figure 2-4 System Turn-Off Procedure

2.4 SYSTEM DIAGNOSTICS

2.4.1 Console Commands

Table 2-3 lists and describes the VAX-11/750 console commands.

Table 2-3 Console Commands

Command	Description
Format:	
B [QUALIFIER]<SP>[DDCU]<CR>	
Qualifiers:	<div> <div>/X</div> <div>/N</div> <div>DD</div> <div>C</div> <div>U</div> </div> <div> <div>Inhibit running of microverify</div> <div>(Hex number) stores boot control flags in R5</div> <div>Device</div> <div>Adapter code</div> <div>Unit number</div> </div>
Examples:	
>>>B DDCU	Boot device specified by DDCU.
>>>B/X DDCU	Boot device specified by DDCU and inhibit microverify
>>>B/n DDCU	Pass four-digit hex number to R5 and boot device specified by DDCU.
>>>D/G/L F 1000	Stores 1000 in PC.
>>>D/P 1000 001234EF	Stores longword of code in 1000.
>>>E/I 25	Examines cache disable register.
>>>I	Performs processor initialize.
>>>B/10 DMA0	Boots diagnostic supervisor from DMA0, without microverify.
>>>X	Binary load/unload command; reserved for use by manufacturing for automated test device (APT) that communicates with the console to transfer data between itself and memory.
Binary Load:	
>>>X<SP>[ADDRESS]<SP><0'COUNT><CR><CHKSUM>[DATA]<CHECKSUM2>	
Address	Starting address of the load
Count	Number of bytes to be transferred (unsigned 30-bit hex number, bit <31> is a zero)
CHKSUM1	Two's complement checksum of the command string
Data	Bytes of binary data
CHKSUM2	Two's complement checksum of the data

Table 2-3 Console Commands (Cont)

Command	Description
Binary Unload:	
>>>X<SP>[ADDRESS]<SP><1'COUNT><CR><CHKSUM>	
Address	Starting address of the unload
Count	Number of bytes to be transferred (unsigned 30-bit hex number, bit <31> is a one)
CHKSUM	Two's complement checksum of the command string
CTRL/P	Enter console mode, issues >>> prompt.
CTRL/D	Enter RDM console mode, issues RDM> prompt.
>>>E	Examine command
>>>D	Deposit command
Format:	
E [QUALIFIER]<SP>[ADDRESS]<SP>	
D [QUALIFIER]<SP>[ADDRESS]<SP>[DATAfcssrbrk<CR>	
Qualifiers: /B Set size to byte	
/W Set size to word	
/L Set size to longword	
/P Physical address space	
/V Virtual address space	
/I IPR	
/G GPR	
Address: nnnn Hex number of physical or virtual address	
<SP>* Last address	
<SP>+ Next address (deposit only)	
<SP>P PSL	

Table 2-3 Console Commands (Cont)

Command	Description
>>>H	Processor halt command
>>>I	Processor initialize command; invalidates TB and cache. Issues processor INIT and UNIBUS INIT.
>>>T	Test command; runs microverify routine.
>>>S nnnn	Start command; performs initialize functions, stores specified hex address in PC, and starts program there.
>>>S<CR>	Start command; performs initialize functions and starts program at current contents of the PC.
>>>C	Continue command; starts program at current contents of the PC without initialize functions.
>>>N	Single-steps the program after the PC is loaded.
>>>B	Boot command; boots from device selected by front-panel device switch.

2.4.2 Diagnostic Testing Strategies

The bottom-to-top diagnostic testing strategy for the VAX-11/750 is to run the level 4, 3, 2, and finally level 1 diagnostics. The following is the preferred sequential testing strategy.

LEVEL 1	EVKAA	Hardcore instruction exerciser
	ECKAL	Cache /TB diagnostic

If the micro verify sequence works, you should attempt to run EVKAA. This program halts on failure. ECKAL is a level 4 diagnostic like EVKAA and halts on failure. You may be able to use the DIAGNOSTIC SUPERVISOR and ECCBA (UBI diagnostic program) to isolate the fault. ECKAL requires that UBI, the UNIBUS, and UET (M9313) be functional to complete successfully.

LEVEL 3	EVKAB	CPU Instruction Exerciser
	EVKAC	Floating-Point Instruction Exerciser
	EVKAD	Compatibility Mode Instruction Test
	EVKAE	Privileged Architecture Test
	EVKAX	VAX-11/750 Specific, WCS, and TU58 diagnostic
	ECKAM	VAX-11/750 memory diagnostic
	ECCBA	UBI diagnostic
	ECCAA	RH750 diagnostic

These level 3 diagnostics should be run in the order shown. ECKAX requires manual intervention if all tests are selected and a scratch TU58 tape is needed to exercise the TU58. ECKAM is a memory diagnostic; the major assumption made by this program is that the first 256 KB is functional. The UBI diagnostic assumes the presence of the M9313 UET to function. The system does not require the M9313 to operate, but this diagnostic will fail without it.

LEVEL 2

These diagnostics are selected depending on the system configuration and run under VMS. Some of the VMS on-line diagnostics that will not run standalone are classified as level 2R. These include lineprinter diagnostics, multiterminal output diagnostics, etc.

LEVEL 1

VMS user-mode diagnostics.

2.4.3 Running the Microverify Test

The micro verify test verifies the integrity of the CPU hardware. Although it does not test the CPU thoroughly, this test does aid in identifying the failures that prevent loading and executing of the hardcore instruction test (EVKAA).

There are three ways to initiate the micro verify test:

1. The test runs automatically on a power up sequence or by pushing the INITIALIZE button.
2. It runs automatically whenever you type the boot command at the console terminal, unless you prevent it by qualifying the boot command with the /X qualifier.
3. You can type the test command (<CR>) and initiate the test in this way.

When the micro verify program begins to run, it types a percent sign (%) on the terminal. After micro verify runs successfully, it types a second percent sign (%). Example 2-1 shows the output for a successful micro verify run.

NOTE

In the following example XXXXXXXX represents the PC.

```
>>>          ! Run micro verify and
              ! initialize.
%%           ! Successful test completion

XXXXXXXX 01

>>>          ! Console prompt
```

Example 2-1 Successful Micro Verify Run Example

Whenever micro verify detects a failure, a single error character is typed in place of the second percent sign, the processor halts in the console I/O mode, and a halt code PC is typed. The halt code indicates that a halt is due to an error condition in the micro verify test. Example 2-2 shows the console output for a micro verify failure.

```
>>>T          ! Run micro verify and
                ! initialize.

%E            ! Scratch pad bit test
                ! failure. Refer to Table 2-4 for
                ! error code interpretation.

00000052 FF    ! Error clearing GPR
                ! Console-halt following
                ! micro verify.

>>>          ! Console input prompt
```

Example 2-2 Microverify Failure

Table 2-4 lists and describes the VAX-11/750 error codes.

Table 2-4 Microverify Error Codes

Console Command Error Codes

Code	Description
720	Memory examine or deposit failed: access violation (ACV), translation not valid (TNV), machine check, bus error, TB parity error, PCS/WCS parity error.
711	Error in accessing IPR or PSL
730	Checksum error on APT load or unload
733	Attempt to boot from unrecognized device (DM, DL, DD, or DB)
734	Controller not A, B, C, or D in BOOT command

Console Halt Codes

Code	Description
01	Test console command executed
02	CTRL/P halt or single macroinstruction mode (>>>N)
04	Interrupt stack not valid
05	Double bus write error halt
06	Processor halt instruction executed (>>>H)
07	Vector <1:0> = 3, halt at vector
08	Vector <1:0> = 2, WCS disabled or not present
0A	Change mode instruction executed on interrupt stack
0B	Change mode instruction executed, vector <1:0> not = 0

Table 2-4 Microverify Error Codes (Cont)

Boot, Power-Up and Initialization Halt Codes

Code	Description
06	Halt instruction on console boot command, boot ROM, or VMB.EXE failed
11	Power-up, cannot find RPB, FPS1 at RESTART/HALT
12	Power-up, warm start flag false FPS1 at RESTART/HALT
13	Power-up, cannot find good 64K bytes of memory
14	Power-up and boot, bad or nonexistent boot ROM
15	Power-up, cold start flag set during boot subroutine
16*	Power-up halt FPS1 at HALT position
FF	Microverify test failure

Code	PC+2	Test Name/Error Message
'@'		BBUS, WBUS test
	000	Bad bit in DREG or SUPROT
	001	Bad bit in RBUS or WBUS
'C'		MBUS test
	031	Bad bit in QREG
	032	Bad bit in MBUS
'E'		Scratch-pad bit test
	051	Error clearing RTEMP
	052	Error filling RTEMP with ones
	054	Error clearing GPR
	057	Error filling GPR with ones
	058	Error clearing IPR
	05B	Error filling IPR with ones
	05D	Error clearing MTEMP
	05E	Error filling MTEMP with ones
'F'		MTEMP explicit address test
	061	Error addressing MTEMP0
	062	Error addressing MTEMP1
	064	Error addressing MTEMP2
	067	Error addressing MTEMP4
	068	Error addressing MTEMP8
'I'		RTEMP explicit address test
	091	Error addressing RTEMP0
	092	Error addressing RTEMP1
	094	Error addressing RTEMP2
	097	Error addressing RTEMP4
	098	Error addressing RTEMP8

*Normal halt.

Table 2-4 Microverify Error Codes (Cont)

Console Command Error Codes

Code	Description
-------------	--------------------

'J'		IPR explicit address test
	0A1	Error addressing IPR0
	0A2	Error addressing IPR1
	0A4	Error addressing IPR2
	0A7	Error addressing IPR4
'L'	0A8	Error addressing IPR8
		GPR explicit address test
	OC1	Error addressing R0
	OC2	Error addressing R1
	OC4	Error addressing R2
	OC7	Error addressing R4
	OC8	Error addressing R8
	OCE	Error addressing dual port

Code	PC+2	Test Name/Error Message
-------------	-------------	--------------------------------

'O'		XB/IR/OSR bit test
	OF1	Error in XB<31:0>
	OF2	Error in XB<63:32>
	OF4	Error in IR
	OF7	Error in OSR
'Q'		Source XB PC increment test
	111	Error sourcing one byte from XB
	112	Error sourcing 2 bytes from XB or incrementing PC by 1
	114	Error sourcing an unaligned longword or incrementing PC by 2
	117	Error incrementing PC by 4
'R'		RNUM/DSIZE test
	121	Error reading DSIZE ROM operand 1
	122	Error loading/reading RNUM
	124	Error reading DSIZE ROM operand 2
	127	Error loading/reading RNUM
	128	Error reading DSIZE ROM operand 3
	12B	Error loading/reading RNUM
	12D	Error reading DSIZE ROM operand 4
'T'	12E	Error loading/reading RNUM
		RNUM/DSIZE test continued
	141	Error reading DSIZE ROM operand 5
	142	Error loading/reading RNUM
'X'	144	Error reading DSIZE ROM operand 6
		Cache parity error test
	181	Failed to get cache parity error
	182	Bad machine check error summary register
	184	Bad cache error register

Table 2-4 Microverify Error Codes (Cont)

Console Command Error Codes

Code	Description
['	TB parity error test
	1B1 Failed to get group 0 TB parity error
	1B2 Bad TB group parity error register
	1B4 Bad machine check error summary register
	1B7 Failed to get group 1 TB parity error
	1B8 Bad TB group parity error register
	1BB Bad machine check error summary register
']	Control store parity error test
	1D1 Failed to get control store parity error
	1B2 Error in control store parity error
(^	Cache test
	1E1 Error filling cache with ones. Location not initially = 0
	1E2 Error filling cache with ones. Unable to write ones

2.4.4 Primary Boot Device Diagnostics

Boot the diagnostic supervisor from a disk per the following procedure:

1. On the CPU console set the POWER ON ACTION switch to the HALT position.
2. Set the BOOT DEVICE switch to the position that corresponds to the diagnostic media.

NOTE

VAX-11/750 Diagnostic System Overview Manual
(EK-VXD-750-UG) contains a functional description
of the boot commands.

The device code for the bootstrap ROMs installed
in the memory controller (L0011 or L0016) can be
examined by console examines of the following
byte locations:

F20400 Boot Device A
F20500 Boot Device B
F20600 Boot Device C
F20700 Boot Device D

Whenever <ddcu> is not specified, the console
uses the BOOT DEVICE switch position on the CPU
front panel to determine the default device.

3. Press the INITIALIZE button on the CPU front panel.
4. Type the following boot command in response to the console prompt:

B/10<space><ddcu><cr>

NOTE

The following command is used to boot VMS or the diagnostic supervisor from a specific device:

B[/X][/<n>[<space><ddcu>]<CR>

Table 2-5 lists and defines the boot command qualifiers. Example 2-3 illustrates boot commands.

Table 2-5 Boot Command

Qualifier	Definition
/X	/X causes the boot command to inhibit microverify.
/n	<n> is a hexadecimal number that specifies the boot control flags. If <n> is omitted, the default value is 0. Table 2-6 describes the software boot control flags.
<space>	<space> represents one typed space.
<ddcu>	<p><ddcu> represents the device to be booted as follows:</p> <p>dd is a two-letter boot device code as shown in Table 2-7.</p> <p>c specifies the I/O channel adapter with a possible value of either A, B, C, or D.</p> <p>u is a one-digit number that specifies the device number.</p>

Table 2-6 Boot Control Flags

Flag	Hex Value	Function
0	1	conversational boot
1	2	debug
2	4	initial breakpoint
3	8	not used
4	10	diagnostic boot
5	20	bootstrap breakthrough
6	40	image header
7	80	memory text inhibit
8	100	filename
9	200	halt before transfer

Table 2-7 Device Codes

Device Code (dd)	Device Type
DL	RL02
DM	RK07
DB	RP04/5/6
DR	RM03
DD	TU58

```
>>>>B/X DMA0      ! Boot VMS from
                    ! the RK07 on channel adapter A
                    ! drive 0 without running micro
                    ! verify.
```

```
.
.
>>>>B/10 DRA1      ! Boot the diagnostic
                    ! supervisor in the
                    ! standalone mode
                    ! from the RM03
                    ! on channel adapter
                    ! A, drive 1 after running
                    ! micro verify.
```

Example 2-3 Boot Commands

5. Type @CONFIG after the diagnostic supervisor's prompt to invoke the configuration file. Invoking the configuration file defines the hardware configuration to the diagnostic supervisor.
6. Use the attach command whenever it is necessary to change the defined hardware configuration for the diagnostic supervisor.

7. Use the select command to select a device for testing.
8. Use the run command to load and start a diagnostic program.

At the completion of a successful boot:

The console prints a message indicating whether or not the verify test revealed any errors, except when /X is typed in the bootstrap command where micro verify is not performed.

The console enters the program I/O mode.

2.4.5 Diagnostic Supervisor Commands

2.4.5.1 @CONFIG Command (or run EVSBA Auto Config Program) – After loading diagnostics from the SYSMANT directory, which was contained on a system disk, you type @CONFIG to invoke the configuration file. This file consists of a series of attach commands that define the hardware configuration for the diagnostic supervisor (Example 2-4).

DIAGNOSTIC SUPERVISOR. ZZ-ECSAA 5.00-61 1 JAN 1980 00:00:00:00

```
DS> @CONFIG<CR>          ! An indirect command file used to
                           ! define the system
                           ! hardware configuration
                           ! to the supervisor.
```

```
DS> ATTACH KA750 CMI KA0 NO NO YES 0 0
DS> ATTACH TU58 KA0 CS1
DS> ATTACH DW750 CMI DW0
DS> ATTACH RK611 DW0 DMA 777440 210 5
DS> ATTACH RK07 DMA DMA0
DS> ATTACH RK07 DMA DMA1
DS> ATTACH RL11 DW0 DLA 774400 160 5
DS> ATTACH RL02 DLA DLA0
DS> ATTACH RL02 DLA DLA1
DS> ATTACH TS11 DW0 MSA0 772520 224 5
DS> ATTACH LP11 DW0 LPA 777514 200 4
DS> ATTACH LP05 LPA LPA0
DS> ATTACH DMC11 DW0 XMA 760070 300 5
DS> ATTACH DZ11 DW0 TTA 760110 310 5 EIA
DS> ATTACH VT100 TTA TTA1
DS> ATTACH VT100 TTA TTA2
DS> ATTACH VT100 TTA TTA3
DS> ATTACH VT100 TTA TTA4
DS> ATTACH VT100 TTA TTA5
DS> ATTACH VT100 TTA TTA6
DS> ATTACH VT100 TTA TTA7
```

```

DS> !
DS> @ <EOF>
DS>     SHOW DEVICE
__KA0 KA750          40F30000      G-floating instructions=NO
      .              H-floating instructions=NO
      .              Time-of-year clock=YES WCS last
address=00000000(X)

      Accelerator type=0
__DW0  DW750          40F30000
__DMA  RK611  __DW0  40FFFF20      CSR=777440(O) VECTOR=000210(O)
BR=5.
__DMA0  RK07  __DMA  00000000
__DMA1  RK07  __DMA  00000000
__DLA  RL11  __DW0  40FFF900 CSR=774400(O) VECTOR=000160(O)
BR=5.
__DLA0  RL02  __DLA  00000000
__CS1   TU58  __KA0  00000000
__LPA   LP11  __DW0  40FFFF4C      CSR=777514(O) VECTOR=000200(O)
BR=4.
__LPA0  LP05  __LPA  00000000
__MSA0  TS11  __DW0  40FFF550      CSR=772520(O) VECTOR=000224(O)
BR=5.
DS> @ <EOF>
DS>     SELECT DW0      ; Select FW0 for testing.
DS>     RUN ECCBA       ; Run the UBI
                        ; diagnostic program.

```

Example 2-4 Diagnostic Supervisor Commands (Sheet 2 of 2)

2.4.5.2 ATTACH Command – The attach command is used to define the device link for the diagnostic supervisor.

The command format is:

ATTACH <uut-type><link-name><generic-device name><CR>

```

DS> ATTACH DZ11 DW0 TTA      ! Attach the DZ11,TTA.
CSR? 760120                 ! The supervisor prompts
VECTOR? 320                 ! for information not
BR? 4                       ! supplied in the command
MODULE TYPE? EIA            ! line.
DS>

```

Example 2-5 Attach Command

The first parameter <uut-type> is the hardware designation of the UUT. For example, RH750, TM03, and TE16 are hardware designations. Refer to Table 2-8 for device naming codes.

Table 2-8 Device Naming Codes

Type	Link	Generic	Additional Information
KA750	CMI	KAn	<G-floating><H-floating> <time-of-year clock> <WCS-last-address> <accelerator type>
RH750	CMI	RHa	
DW750	CMI	DWa	
RP06	RHa	DBan	
RP05	RHa	DBan	
RP04	RHa	DBan	
RM03	RHa	DRan	
RK611	DWa	DMa	<user> <uvector> <ubr>
RK07	DMa	DMan	
RK06	DMa	DMan	
TM03	RHa	MTa	<drive>
TE16	MTa	MTan	
TU45	MTa	MTan	
TU77	MTa	MTan	
DZ11	DWa	TTA	<ucsr> <uvector> <ubr> <EIA> ! <20MA>
DUP11	DWa	XJan	<ucsr> <uvector> <ubr>
DMC11	DWa	XMan	<ucsr> <uvector> <ubr>
KMC11	DWa	XMan	<ucsr> <uvector> <ubr>
LP11	DWa	LPa	<ucsr> <uvector> <ubr>
CR11	DWa	CRa	<ucsr> <uvector> <ubr>
DR11B	DWa	??a	<ucsr> <uvector> <ubr>
PCL11	DWa	??a	<ucsr> <uvector> <ubr>
TS04	DWa	MTan	<ucsr> <uvector> <ubr>
RL02	DLa	DLan	
RL11	DWa	DLa	<ucsr> <uvector> <ubr>

The second parameter, <link-name>, is the name of the hardware that links the UUT to the CMI bus.

The third parameter is the generic device name, which identifies to the diagnostic supervisor the particular unit to be tested. Use the form “GGan” for the device name. “GG” is a 2-character generic device name (alphabetic) while “a” is an alphabetic character specifying the device controller, and “n” is a decimal number in the range of 0-255, specifying the number of the unit with respect to the controller.

The definitions for the additional fields are:

<drive>	MASSBUS drive	decimal	0–7
<ucsr>	UNIBUS CSR address	octal	760000–777776
<uvector>	UNIBUS vector	octal	2–776
<ubr>	UNIBUS BR level	decimal	4–7

In the generic name:

“a” is a letter from A to Z.

“n” is a decimal number in the range 0 to 255.

“??” is a generic device name that may be any two letters.

Use the unit number, “n” or “a”, only if it is applicable to the device. At times you must supply additional information for some types of hardware to enable the diagnostic program to address the device. For example you must supply the controller number for a TM03. Whenever you do not include the necessary additional information, the supervisor prompts you for it (Example 2-5).

2.4.5.3 SELECT Command – The select command format is:

```
SELECT<space><generic-device name>[:]<CR>
```

You must select each unit to be tested with the select command. The command takes effect the next time the diagnostic program is started. For each unit, you supply the appropriate generic device name, as shown in Table 2-7 and Example 2-4.

2.4.5.4 SHOW DEVICE Command – The show device command format is:

```
SHOW DEVICE <generic-device-name>[:]<CR>  
[,<generic-device-name>[:]· ·]<CR>
```

This command causes the diagnostic supervisor to display the characteristics of the specified devices on the operator’s terminal. If you omit the device name, the diagnostic supervisor will list the characteristics of all attached devices.

2.4.5.5 SHOW SELECT Command – The show select command format is:

```
SHOW SELECT <CR>
```

This command displays information in the same format as the show device command. However, the information is shown only for the devices that have been previously selected.

2.4.5.6 RUN Command – The run command is equivalent to a load and start command sequence. The run command format is:

```
RUN<space><file-spec><CR>
```

Refer to Example 2-4.

2.4.6 Running TU58 Diagnostics

Table 2-9 lists VAX-11/750 diagnostics.

Table 2-9 VAX-11/750 Diagnostics

Diagnostic	Description
CPU Diagnostics	
ECKAB	Microdiagnostic DPM
ECKAC	Microdiagnostic MIC
ECKAL	Cache/TB
ECKAM	Memory
ECKAX	Cluster exerciser
ECSAA	Diagnostic supervisor
EVKAA	Hardcore instructions
EVKAB	Architectural instructions
EVKAD	Compatibility mode instructions
EVKAE	Privileged architectural instructions
MICRO	Verify test under CCL
Floating-Point Diagnostics	
EVKAB	Architectural instructions
EVKAC	FP instructions exerciser
ECKAD	Microdiagnostics
RH750 Diagnostics	
ECCAA	RH750 diagnostics
UBI/DW750 Diagnostics	
ECCBA	UBI/DW750 diagnostics
DMF32/DZ11/DZ32 Diagnostics	
EVDAA	DZ11
DVDAB	DZ32
EVDAC	DZ32
EVDLB	DMF32 synchronous
EVDLC	DMF32 asynchronous
EVDLD	DMF32 parallel

Table 2-9 VAX-11/750 Diagnostics

Diagnostic	Description
DR750 Diagnostics	
ECDFA	Micromachine
ECDFB	Silomachine
EVDFFD	VAX-11/750/780 self-test
EVDFF	VAX-11/750/780 user mode
EVDFFG	DR-to-DR device

Example 2-6 illustrates a successful CPU diagnostics (TU58) run. The underlined portions are examples of what you, the operator, must type.

B DDA0

%%

EVKAA-5.0 done!

EVKAA-5.0 done!

EVKAA-5.0 done!

EVKAA-5.0 done!

EVKAA-5.0 done!

00008D9E 02

>>>B DDA0

%%

ECKAL-2.0 DONE!

ECKAL-2.0 DONE!

ECKAL-2.0 DONE!

ECKAL-2.0 DONE!

ECKAL-2.0 DONE!

0000445C 02

>>>B/10 DDA0

%%

DIAGNOSTIC SUPERVISOR. ZZ-ECSAA-5.3-113 19-DEC-1980 09:23:55.31

DS> ATTACH KA750 CMI KA0

G-floating instructions? NO

H-floating instructions? NO

Time-of-year clock? YES

WCS last address? 0

Accelerator type? 0

DS> SELECT KA0

DS> SET TRACE

DS> RUN EVKAB

Example 2-6 Successful CPU Diagnostics (TU58) Run Example
(Sheet 1 of 5)

or

DIAGNOSTIC SUPERVISOR. ZZ-ECSAA-Y6.11-342 7-JUL-1983 17:17:58

DA> run evsba

..Program: EVSBA - AUTOSIZER LEVEL 3, revision 1.7, 3 tests,
at 17:18:35.72.

EVSBA WORKING.

..End of run, 0 errors detected, pass count is 1,
time is 7-JUL-1983 17:19:53.44

DS> sel all

DS> set trace

DS> run evkab

..Program: VAX Basic Instructions Exerciser, ZZ-EVKAB, revision
2.4, 10 tests

Testing: _KA0

Test 1: Integer Arithmetic and Logical Instructions

Test 2: Variable Length Bit Field Instructions

Test 3: Basic Branch Instructions

Test 4: Single Bit Field Control Instructions

Test 5: Integer Arithmetic Control Instructions

Test 6: INDEX Instruction

Test 7: Queue Instructions

Test 8: Character String Instructions

Test 9: Decimal String Instructions

Test 10: Edit Instruction

..End of run, 0 errors detected, pass count is 1,
time is 7-JUL-1983 17:40:57.86

DS> run evkac

..Program: VAX Floating Point Instructions Exerciser, ZZ-EVKAC,
revision 4.0 tests, at 17:41:49.72.

Testing: _KA0

Test 1: Single Precision Floating Point Instructions

Test 2: Double Precision Floating Point Instructions

Test 3: Extended Range Double Precision Floating Point
Instructions

Test 4: Extended Range Quadruple Precision Floating Point
Instructions

..End of run, 0 errors detected, pass count is 1,
time is 7-JUL-1983 17:46:08.72

DS> set quick

DS> run eckam

.. Program: ECKAM-REV. 2.4 MS750 MEMORY DIAGNOSTIC, revision 2.4,
12 tests, at 17:47:12.40.

Example 2-6 Successful CPU Diagnostics (TU58) Run Example
(Sheet 2 of 5)

```
***** **
WARNING: DIAGNOSTIC DEFAULTS TO AN EXHAUSTIVE RUN.
FOR A QUICK VERIFY OF THE MEMORY, TYPE CTRL C AND
ABO. WHEN RETURNED TO DS PROMPT, SET FLAG QUICK
AND RESTART THE PROGRAM.
NOTE ALSO, ONLY MEMORY ABOVE THE DIAGNOSTIC
SUPERVISOR IS TESTED. ARRAY + ROW UNDER TEST
PRINTOUTS IN TESTS 10, 11, AND 12 WILL INDICATE
WHAT'S BEING TESTED.
***** **
```

```
HIGHEST LONGWORD ADDRESS IS: 0057FFFC(X)
Test 1: MEMORY MAP VERIFICATION TEST
MEMORYMAP VALID: 00003EAA(X) FOR: L0016 CONTROLLER
SLOT[0] IS A 1024 KB ARRAY
SLOT[1] IS A 1024 KB ARRAY
SLOT[2] IS A 1024 KB ARRAY
SLOT[3] IS A 1024 KB ARRAY
SLOT[4] IS A 1024 KB ARRAY
SLOT[5] IS A 256 KB ARRAY
SLOT[6] IS A 256 KB ARRAY
SLOT[7] IS A 256 KB ARRAY
Test 2: DATA BUS TEST
Test 3: ROW SELECT BUS TEST
Test 4: ADDRESS BUS TEST
Test 5: ECC LOGIC TEST
Test 6: CSC0 TEST
Test 7: BOOTSTRAP ROM TEST
```

```
ROM NUMBER: A DEVICE TYPE: DD
ROM NUMBER: B DEVICE TYPE: DL
ROM NUMBER: C DEVICE TYPE: DM
ROM NUMBER: D DEVICE TYPE: DB
```

```
Test 8: CPU LOST ERROR TEST
Test 9: CPU XB ERROR BIT TEST
Test 10: MOVING INVERSIONS TEST [aborted]
Test 12: MEMORY QUICK VERIFY TEST
ARRAY[1] SINGLE BIT ERRORS:
          ROW 0 - 0
          ROW 1 - 0
          ROW 2 - 0
          ROW 3 - 0
ARRAY[2] SINGLE BIT ERRORS:
          ROW 0 - 0
          ROW 1 - 0
          ROW 2 - 0
          ROW 3 - 0
```

Example 2-6 Successful CPU Diagnostics (TU58) Run Example
(Sheet 3 of 5)

```

ARRAY[3]  SINGLE BIT ERRORS:
          ROW 0 - 0
          ROW 1 - 0
          ROW 2 - 0
          ROW 3 - 0
ARRAY[4]  SINGLE BIT ERRORS:
          ROW 0 - 0
          ROW 1 - 0
          ROW 2 - 0
          ROW 3 - 0
ARRAY[5]  SINGLE BIT ERRORS:
          ROW 0 - 0
          ROW 1 - 0
          ROW 2 - 0
          ROW 3 - 0
ARRAY[6]  SINGLE BIT ERRORS:
          ROW 0 - 0
          ROW 1 - 0
          ROW 2 - 0
          ROW 3 - 0

```

THERE WERE NO CORRECTABLE ERRORS

..End of run, 0 errors detected, pass count is 1,
time is 7-JUL-1983 17:52:49.58

DS> run eccba

..Program: ECCBA-REV 1.2 VAX 11/750 (UBI), DW750 Diagnostic
revision 1.2, tests. at 17:53:18.76.

Testing: _DW0

```

Test 1: Control and Status Register Test
Test 2: Map Data Bus Test
Test 3: Map Chip Select Test
Test 4: Map Address But Test
Test 5: Map Entry Test
Test 6: CPU Read/Write Test
Test 7: CMI to Unibus Addressing Test
Test 8: Unibus to CMI Addressing Test
Test 9: Data Path Select Test
Test 10: Direct Data Path DATI Test
Test 11: Direct Data Path DATIP/DATO Test
Test 12: Direct Data Path DATOB Test
Test 13: Buffered Address Register Test
Test 14: Buffered Data Path DATI Test
Test 15: Buffered Data path DATIP Test
Test 16: Buffered Data Path DATO Test
Test 17: Buffered Data Path DATOB Test
Test 18: Buffered Data Path Autopurge Test
Test 19: Byte Offset DATI Test
Test 20: Byte Offset DATIP/DATO Test
Test 21: Byte Offset DDP DATO Test
Test 22: Byte Offset BDP DATO Test

```

Example 2-6 Successful CPU Diagnostics (TU58) Run Example
(Sheet 4 of 5)

Test 23: Byte Offset DDP DATOB Test
Test 24: Byte offset BDP DATOB Test
Test 25: Map Entry Functional Test
Test 26: CSR Status Bit Test
Test 27: UET CSR1 Interrupt Test
Test 28: UET CSR2 Interrupt Test [aborted]
Test 29: UET CSR1/CSR2 ALLOW Test [aborted]
Test 30: Map Invalid Test
Test 31: UET PB Bit Test
Test 32: UBE Block Transfer Test
NO UBES SELECTED. SKIPPING TEST
..End of run, 0 errors detected, pass count is 1,
time is 7-JUL-1983 17:54:02.16

Example 2-6 Successful CPU Diagnostics (TU58) Run Example
(Sheet 5 of 5)

2.4.7 Running VMS Diagnostics (User Mode)

Run VMS (on-line) diagnostics as follows:

1. Boot VMS per the Appendix B (Standalone backup loading procedure).
2. Log into the field service account.
3. Type RUN ECSAA, after VMS's prompt, \$, to load the diagnostic supervisor.
4. Invoke the configuration file to define the hardware configuration for the diagnostic supervisor.
5. Use the SELECT command to select a device for testing.
6. Use the SHOW DEVICE command to display the characteristics of the specified devices on the operator's terminal.
7. Use the SHOW SELECT command to display the information for the device(s) that has (have) been previously selected.
8. Use the RUN command to run the required diagnostic program.

Example 2-7 shows how to run a VMS Diagnostic program.

Username: FIELD
Password:

Welcome to VAX/VMS Version 2.0

\$ RUN ECSAA

DIAGNOSTIC SUPERVISOR. ZZ-ECSAA-5.4-121 21-AUG-L980 08:30:36

DS> @CONFIG

DS> ATTACH KA750 CMI KA0 NO NO YES 0 0

DS> ATTACH TU58 KA0 CS1

DS> ATTACH DW750 CMI DW0

DS> ATTACH RK611 DW0 DMA 777440 210 5

DS> ATTACH RK07 DMA DMA0

DS> ATTACH RK07 DMA DMA1

DS> ATTACH RL11 DLA 774400 160 5

DS> ATTACH RL02 DLA DLA0

DS> ATTACH RL02 DLA DLA1

DS> ATTACH TS11 DW0 MSA0 772520 224 5

DS> ATTACH LP11 DW0 LPA 777514 200 4

DS> ATTACH LP05 LPA LPA0

DS> ATTACH DMC11 DW0 XMA 760070 300 5

DS> ATTACH DZ11 DW0 TTA 760110 310 5 EIA

DS> ATTACH VT100 TTA TTA1

DS> ATTACH VT100 TTA TTA2

DS> ATTACH VT100 TTA TTA3

DS> ATTACH VT100 TTA TTA4

DS> ATTACH VT100 TTA TTA5

DS> ATTACH VT100 TTA TTA6

DS> ATTACH VT100 TTA TTA7

DS> !

DS> @ <EOF>

DS> SELECT MSA0

DS> SHOW DEVICE

__KA0 KA750	40F30000	G-floating instructions=NO H-floating instructions=NO Time-of-year clock=YES WCS last address=00000000(X) Accelerator type=0.
__DW0 DW750	40F30000	
__DMA RK611	__DW0 40FFFF20	CSR=777440(O) VECTOR=000210(O)
BR=5.		
__DMA0 RK07	__DMA 00000000	
__DMA1 RK07	__DMA 00000000	
__DLA RL11	__DW0 40FFF900	CSR=774400(O) VECTOR=000160(O)
BR=5.		
__DLA0 RL02	__DLA 00000000	
__CS1 TU58	__KA0 00000000	
__LPA LP11	__DW0 40FFFF4C	CSR=777514(O) VECTOR=000200(O)
BR=4.		

Example 2-7 Running VMS Diagnostics (Sheet 1 of 2)

```

_LPA0 LP05      _LPA    00000000
_MSA0 TS11      _DW0    40FFF550      CSR=772520(O) VECTOR=000224(O)
BR=5.
DS>  SHOW SELECT
_MSA0 TS11      _DW0    40FFF550      CSR=772520(O) VECTOR=000224(O)
BR=5.
DS>  RUN EVMAA

```

Example 2-7 Running VMS Diagnostics (Sheet 2 of 2)

2.4.8 User Environment Test Package (UETP)

2.4.8.1 Prerequisites

1. System must first be bootstrapped.
2. Do not run the UETP with other user programs or while user volumes are mounted. By design, the UETP assumes and requests the exclusive use of system resources. Unpredictable results could occur if this restriction is ignored. For example, since the UETP uses large amounts of many system resources, such as memory pool space and disk space, it may interfere with applications that depend on these resources.

2.4.8.2 Logging In – Log in under the SYSTEST account as follows:

Username: SYSTEST
Password: UETP

NOTE

The password on your system may have been changed; if it has not, you should change it with the DCL command SET PASSWORD. Unauthorized use of this privileged account may compromise the security and privacy of your installation.

2.4.8.3 Preparing Devices – After you log in, make certain that:

1. All devices to be tested are powered up and on-line to the system.
2. Disks are mounted (using the DCL command MOUNT/SYSTEM) and initialized (using the DCL command INITIALIZE).
3. Disks contain a directory [SYSTEST] with UIC=[1,7] (using the DCL command CREATE/DIRECTORY).
4. Magnetic tape reels are mounted on each drive to be tested and are initialized with the label UETP (using the DCL command INITIALIZE).

5. Magnetic tape reels contain at least 600 feet of tape.
6. Line printers and hard-copy terminals are well supplied with paper.
7. Terminal characteristics and baud rate are set correctly. (See the User's Guide for your terminal.)

2.4.8.4 Running UETP – Enter the following command at the dollar sign prompt (\$):

\$ @UETP

The UETP will respond with the following question:

Run "ALL" UETP phases or just "ONE" [ALL]?

Press RETURN (that is, accept the default response enclosed in brackets). The UETP will respond with three more questions in the following sequence:

How many passes of UETP do you wish to run [1]?

How many simulated user loads to you want [n]?

Do you want Long or Short report format [Long]?

Press RETURN in response to each question. After you have answered the last question, the UETP initiates its entire sequence of tests, which run to completion without further input from you. If the run completes successfully, your VAX/VMS system is in proper working order.

NOTE

After a run of the UETP, you should always run the SYE report generator to check for UETP-induced hardware problems. The VAX-11 Utilities Reference Manual contains SYE operating instructions.

Additional UETP information can be found in the VAX/VMS UETP User's Guide.

2.4.9 PCS750 Diagnostics

Run PCS750 diagnostics as follows:

1. Power up the system.
2. Boot the Diagnostic Supervisor to automatically load the PCS for testing.

NOTE

The minimum revision level of the Diagnostic Supervisor (ECSAA) that will load the PCS with microcode is 6.10B.

2.4.9.1 Updating VMS (To Load the PCS) for PCS750

1. Boot VMS.

NOTE

Booting VMS will not load the PCS unless SYSTAR-TUP.COM has been updated to do so.

2. Log in under the system manager account.
3. Set the default to [SYSUPD].
4. Insert the PCS750KIT TU58 cassette (BE-T538A-BE) in CSa1.
5. Type @VMSUPDATE.

NOTE

You will be asked some questions, the first one being, “Are you ready?” This is just to see if the TU58 is loaded. Answering “yes” will mount the TU58. From this point on the command file on the TU58 will be run.

6. Answer the two questions asked by the update command file program.
 - a. Question 1:

If you have battery backup, do you want powerfail recovery?

NOTE

Powerfail recovery does not work at this time with all VMS Version 2 systems.

The answer to this question determines how a power failure is to be handled. If you have a power failure and you have battery backup, the PCS will not be reloaded unless the PCS device driver is included along with the proper command file that defines that device driver.

Answering “yes” to this question means the device driver (PCS750DRV) will be included with the PCS loader utility (PCS750UTL). Also, the command file PCS750RES.COM will be added to the system manager account ([SYSMGR]) and SYSTARTUP.COM will be appended to call that command file. If a power failure occurs with battery backup, the driver will be awakened by the system to reload the PCS. If you answer “no” to this question, the driver will not be included with the utility, and the command file PCS750.COM will be added to [SYSMGR] with a call to that command file from SYSTARTUP.COM.

b. Question 2:

Do you want SYSTARTUP.COM updated to load PCS?

This question is whether to append PCS750.COM or PCS750RES.COM to SYSTARTUP.COM (depending on your answer to Question 1).

Answer "yes" to this question if this is the first time you are running the update command to install PCS loaders.

Answer "no" to this question if you are just updating the binary file or software, if you already have a call to the command files in SYSTARTUP.COM, or if you plan to use a different command file to load the PCS.

2.4.9.2 VMS Update Checks – After the two previous questions have been answered, the update command file will put the files in the proper locations and modify SYSTARTUP.COM to load the PCS upon power-up or restart. When the update command file is complete, do the following checks:

1. All files named PCS*. * are deleted out of [SYSUPD].
2. The following are in [SYSUPD]:
 - a. PCS750.BIN
 - b. PCS750UTL.EXE
 - c. PCS750DRV.EXE
(only if you answered "yes" to Question 1).
3. If you answered "yes" to Question 1:
 - a. Check that PCS750RES.COM is in [SYSMGR].
 - b. Check that SYSTARTUP.COM has \$ @PCS750RES
(as the last command).
4. If you answered "no" to Question 1:
 - a. Check that PCS750.COM is in [SYSMGR].
 - b. Check that SYSTARTUP.COM has \$ @PCS750
(as the last command).
5. Edit SYSTARTUP.COM so that either @PCS750 or @PCS750RES is near the beginning.
6. Check that there is only one call to load the PCS from SYSTARTUP.COM
7. Reboot the system to load patches.

PART II

OPTIONS INSTALLATION

BLANK

CHAPTER 3

OPTIONS UNPACKING AND INSPECTION

3.1 GENERAL

Unpacking and inspection of options consists of:

1. Setting up a static discharge system
2. Unpacking and inspecting option component parts

CAUTION

Small component parts such as cardcage assemblies, modules, and chips must be unpacked and inspected on the static discharge system mat to prevent equipment damage from static electricity discharges.

3.2 STATIC DISCHARGE SYSTEM SET-UP

NOTE

The following information is for the field service representative. The self-maintenance customer must follow similar precautions.

1. Unpack a VELOSTAT™ static discharge system (CD Kit No. A2-W0299-10).
2. Unfold the VELOSTAT™ mat.
3. Attach the 15-foot ground cord to the mat snap fastener.
4. Attach the 15-foot ground cord alligator clip to a good electrical ground point in the VAX-11/750.
5. Install the wrist strap on your wrist.
6. Attach the wrist strap grounding strap to a convenient part of the mat.

3.3 OPTIONS UNPACKING

1. Make sure the shipping container is sealed and undamaged and that the correct number of containers was shipped. Report any differences to the customer.

CAUTION

Utilize the static discharge system when handling component parts small enough to be placed on the static discharge system mat. Use of the mat will prevent equipment damage from static electricity discharges.

VELOSTAT is a registered trademark of the 3M Company.

2. Open the containers one at a time, starting with the one marked "Open Me First." Inventory the contents via the packing slip and record any missing items on the installation report.

NOTE

If any items are missing the customer should check with the carrier.

Packing materials (for example, foam fillers, plastic inserts) should be retained if reshipment is contemplated.

3.4 OPTIONS INSPECTION

Inspect the equipment for any damage. If any damage is found notify the customer and also record it on the installation report. Damaged components requiring replacement should be immediately reported to the branch service manager.

CAUTION

Use the static discharge system when handling component parts small enough to be placed on the static discharge system mat. Use of the mat will prevent equipment damage from static electricity discharges.

CHAPTER 4

COMMUNICATIONS OPTIONS (DMF32, DZ11)

INSTALLATION

4.1 DMF32 INSTALLATION

4.1.1 DMF32 Installation Procedure

CAUTION

Perform the Chapter 3 static discharge system set-up procedure to prevent equipment damage via static electricity discharges during unpacking and installation of the DMF32.

4.1.1.1 M8396 Module Installation

1. Turn off the system per the System Turn-Off Procedure, Figure 2-4.
2. Set the switches on the E77 switchpack (Figure 4-1) to the correct priority level; also set switch E77-1 to ON and switch E77-10 to OFF.
3. Check that all eight DMF32 jumpers (Figure 4-1) have been installed on the DMF32. Table 4-1 lists the jumper functions.

Table 4-1 DMF32 Jumper Functions

Jumper	Name	Function
W1	UNIBUS INIT	Out – Disables UNIBUS INIT In – Enables UNIBUS INIT
W2	SYNC DSR	Always installed
W3	RX D RTN	Always installed
W4	DSR RTN	Always installed
W5	DLE TX CLK RTN	Always installed
W6	DLE RX CLK RTN	Always installed
W7	ASYNCR 0 DSR	Always installed

4. Set switchpack E75 for the DMF32 CSR address.
5. Install the M8396 module in any empty UNIBUS option slot.
6. Remove the NPG jumper from the backplane slot pins CA1 to CB1 the M8396 module was installed in.

NOTE

NPG jumper removal applies only to backplanes on which G727 grant cards have been installed on.

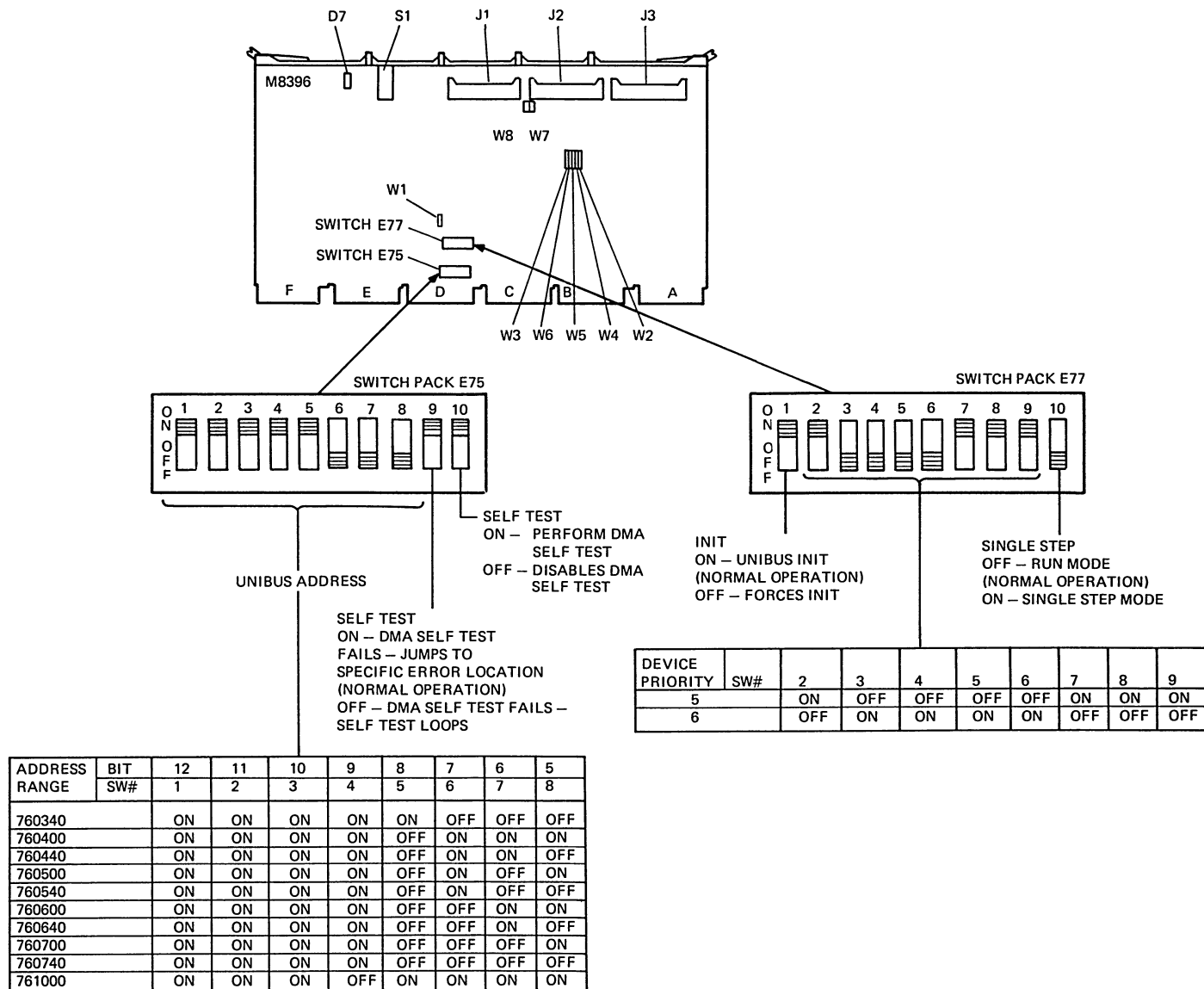
4.1.1.2 DMF32 Distribution Panel Installation

1. Remove the blank panels from the lowest available location for the distribution panel.
2. Install the distribution panel (Figure 4-2) initially at an angle so that the lip of the distribution panel is positioned behind the mounting frame.
3. Install the distribution panel flush with the mounting frame and then secure it with mounting hardware.
4. Install the three ribbon cables per Figure 4-3.

4.1.2 DMF32 Diagnostics

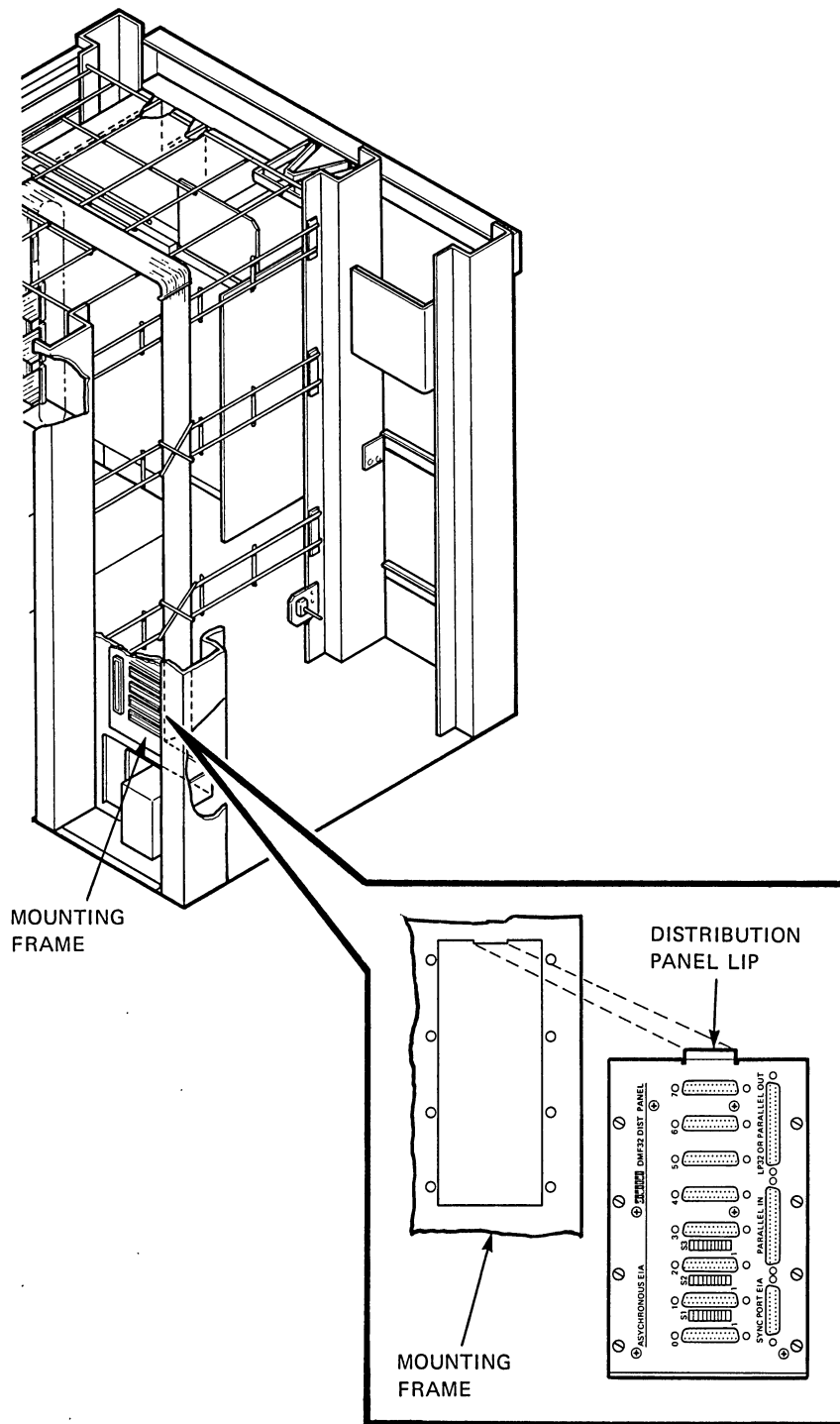
Run three passes of the following:

1. EVDLB
2. EVDLC
3. EVDLD



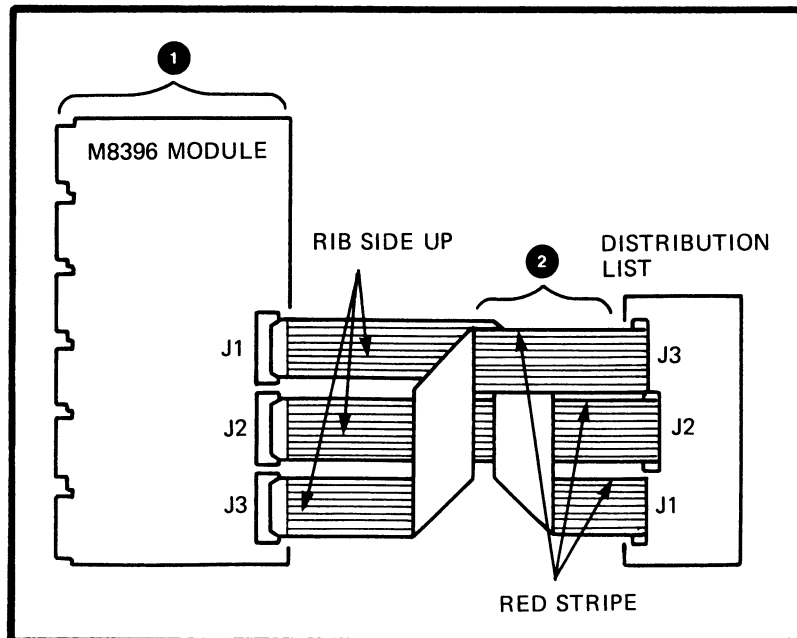
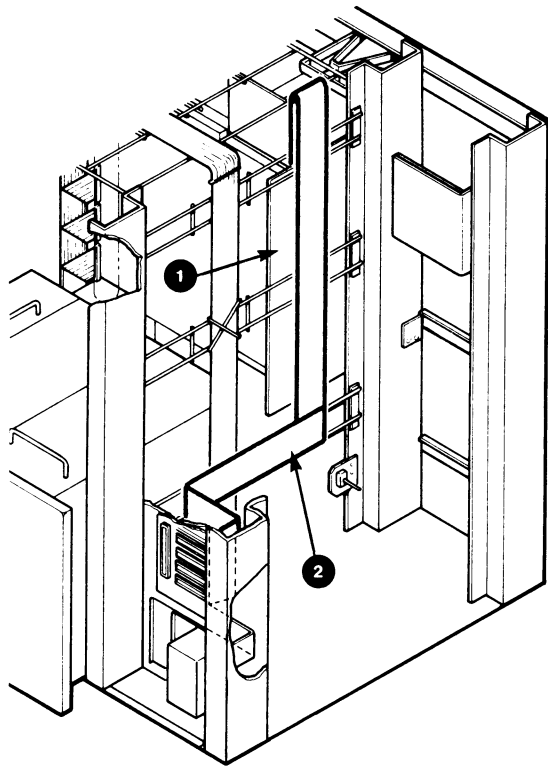
TK-8589

Figure 4-1 DMF32 Switch Settings and Jumper Locations



MKV84-0818

Figure 4-2 Distribution Panel Installation



MKV84-0819

Figure 4-3 BC06R Cable Connections

4.2 DZ11 INSTALLATION

Turn off the system per the System Turn-Off Procedure, Figure 2-4.

4.2.1 M7819 Module Installation

1. Check Table 4-2 for the DZ11 list of materials.
2. Check that a BR5 plug (Figure 4-4) has been installed on the M7819 module E52 socket.
3. Set the address assignment switches at E81 (Figure 4-5) so that the module will respond to its assigned address. When a switch is closed (on), a binary is decoded. When a switch is open (off), a binary 0 is decoded.

NOTE

Switch labeled 1 corresponds to bit 3, 2 corresponds to bit 4, etc.

4. Vector selection is accomplished by the 8-position switch at E11. Switch positions 1 and 8 are not used. Switch position 2 corresponds to vector bit 3, 3 corresponds to vector bit 4, etc. When a switch is closed (on), a binary 0 is decoded. When a switch is open (off) a binary 1 is decoded.

NOTE

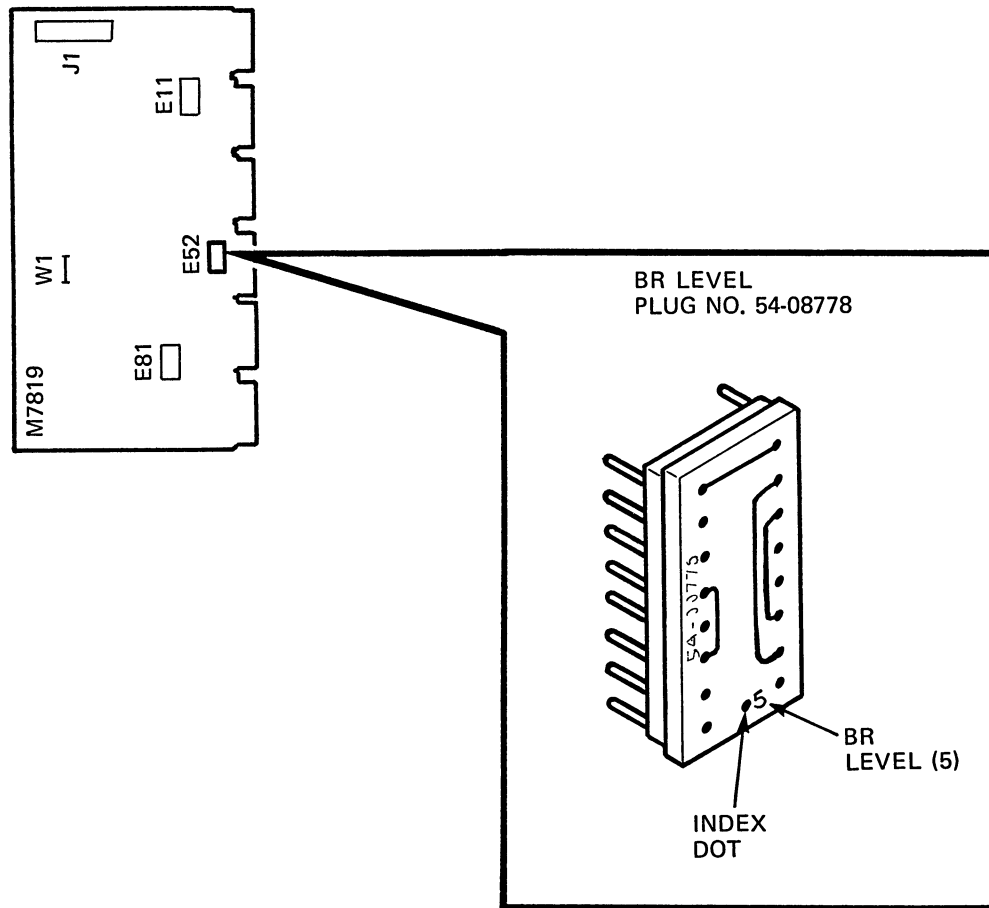
**This is opposite of the address switch decoding.
(See Figure 4-6.)**

5. Insert the module(s) into an SPC slot and connect the flat shielded cable (BC05W-15), ribbed side up, to J1 on the module(s). Connect the other end of the cable, ribbed side up, to the H3271.

NOTES

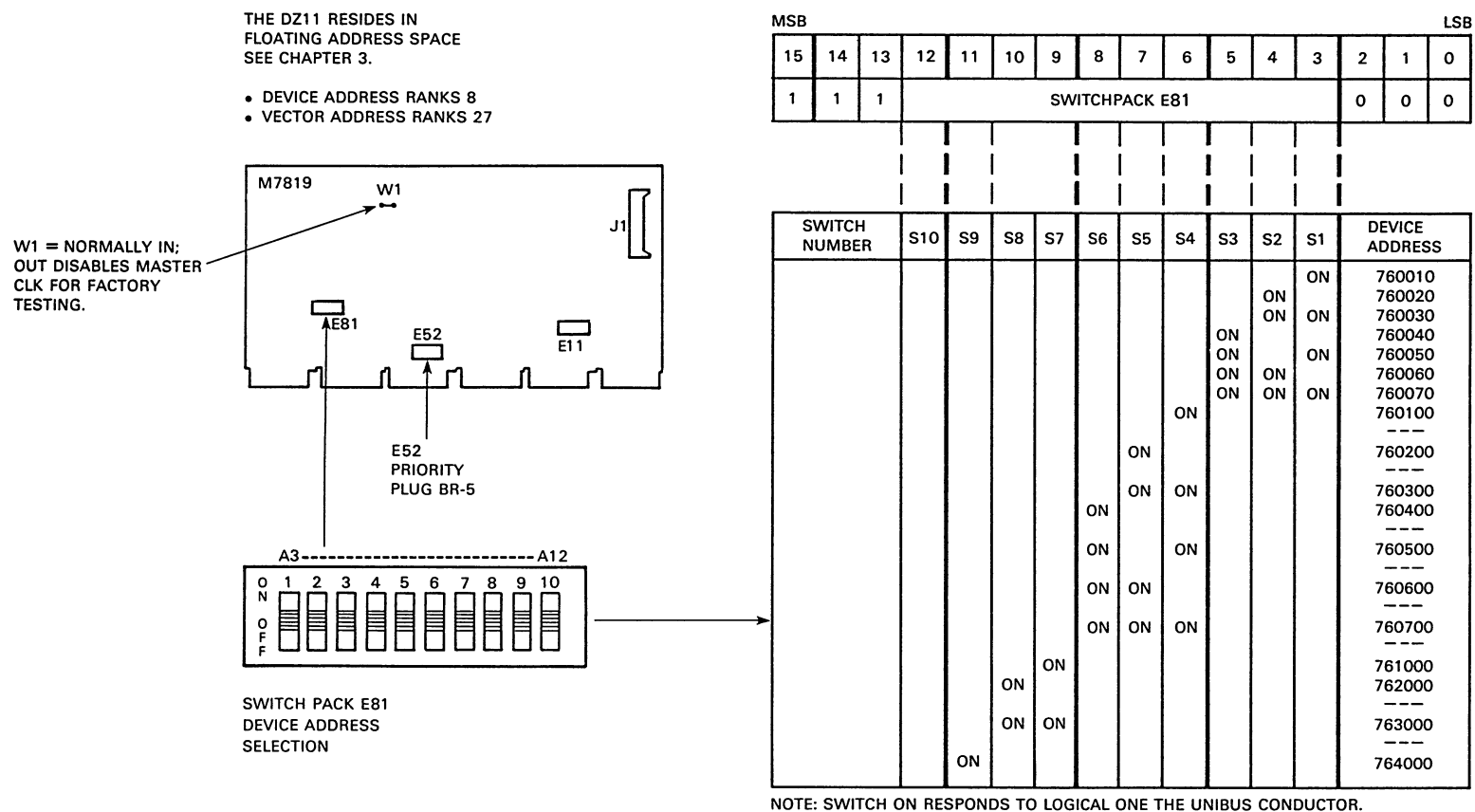
Insert and remove modules slowly and carefully to avoid snagging module components on the card guides and changing switch settings.

Make sure that the BC05W cable is installed correctly before applying system power. Improper cable connections may result in damage to EIA drivers and receivers.



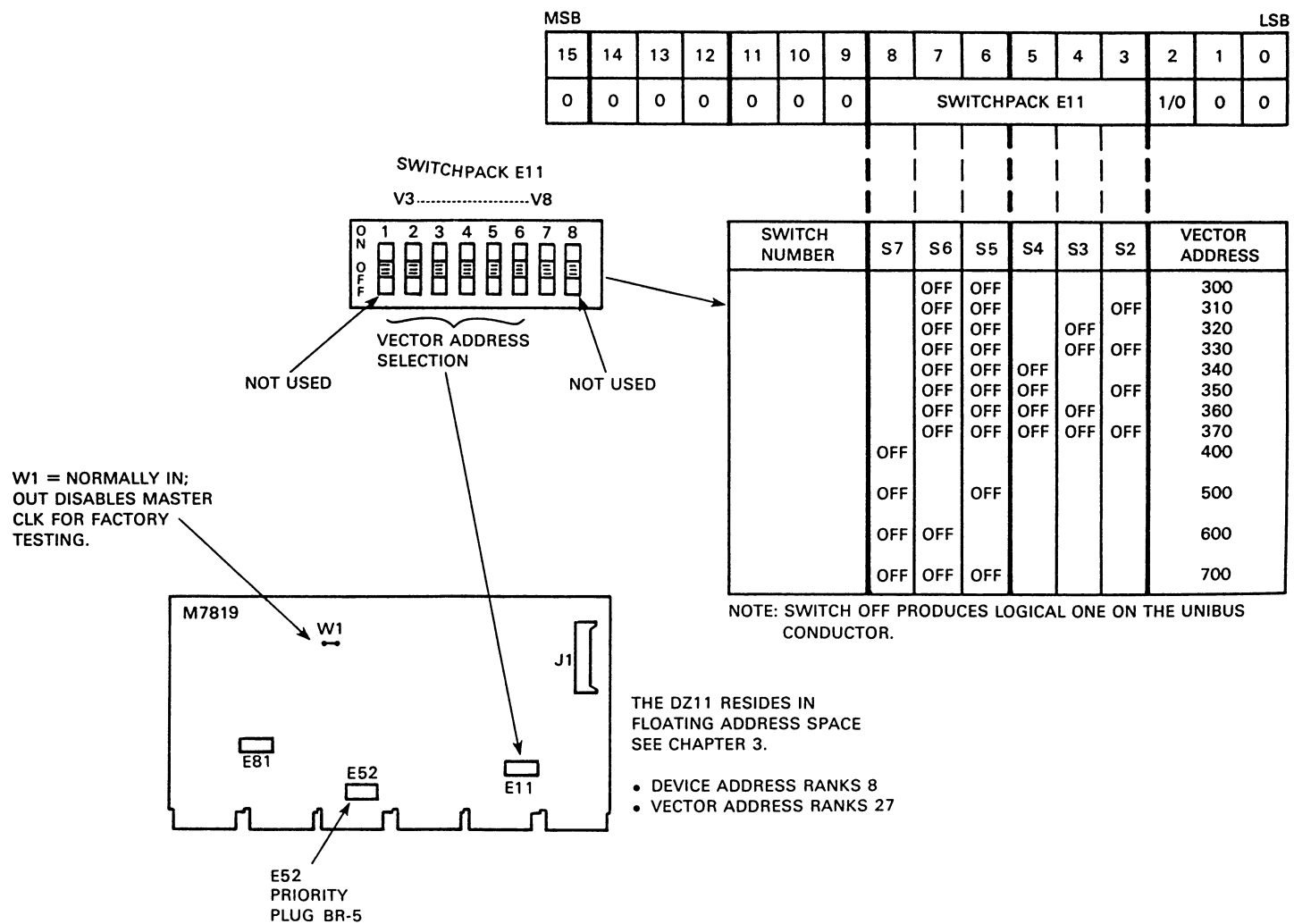
MKV84-0820

Figure 4-4 M7819 Module Bus Request Plug Details



MK-4575

Figure 4-5 M7819 Address and Vector Selection (Sheet 1 of 2)

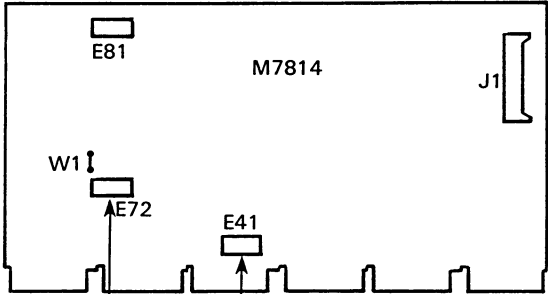


MK-4576

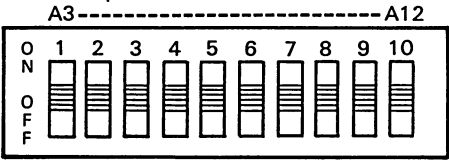
Figure 4-5 M7819 Address and Vector Selection (Sheet 2 of 2)

THE DZ11 RESIDES IN
FLOATING ADDRESS SPACE
SEE CHAPTER 3.

- DEVICE ADDRESS RANKS 8
- VECTOR ADDRESS RANKS 27



PRIORITY
PLUG E41
BR-5



SWITCH PACK E72
DEVICE ADDRESS
SELECTION

MSB													LSB		
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	1	1	SWITCHPACK E72										0	0	0

SWITCH NUMBER	S10	S9	S8	S7	S6	S5	S4	S3	S2	S1	DEVICE ADDRESS
										ON	760010
									ON	ON	760020
									ON	ON	760030
								ON	ON	ON	760040
								ON	ON	ON	760050
								ON	ON	ON	760060
								ON	ON	ON	760070
								ON	ON	ON	760100
								ON	ON	ON	---
						ON		ON	ON	ON	760200
						ON		ON	ON	ON	---
					ON	ON		ON	ON	ON	760300
					ON	ON		ON	ON	ON	760400
					ON	ON		ON	ON	ON	---
					ON	ON		ON	ON	ON	760500
					ON	ON		ON	ON	ON	---
					ON	ON		ON	ON	ON	760600
					ON	ON		ON	ON	ON	---
					ON	ON		ON	ON	ON	760700
					ON	ON		ON	ON	ON	---
				ON							761000
			ON	ON							762000
			ON	ON							---
			ON	ON							763000
			ON	ON							---
			ON	ON							764000

NOTE: SWITCH ON RESPONDS TO LOGICAL ONE THE UNIBUS CONDUCTOR.

Figure 4-6 M7814 Address and Vector Selection (Sheet 1 of 2)

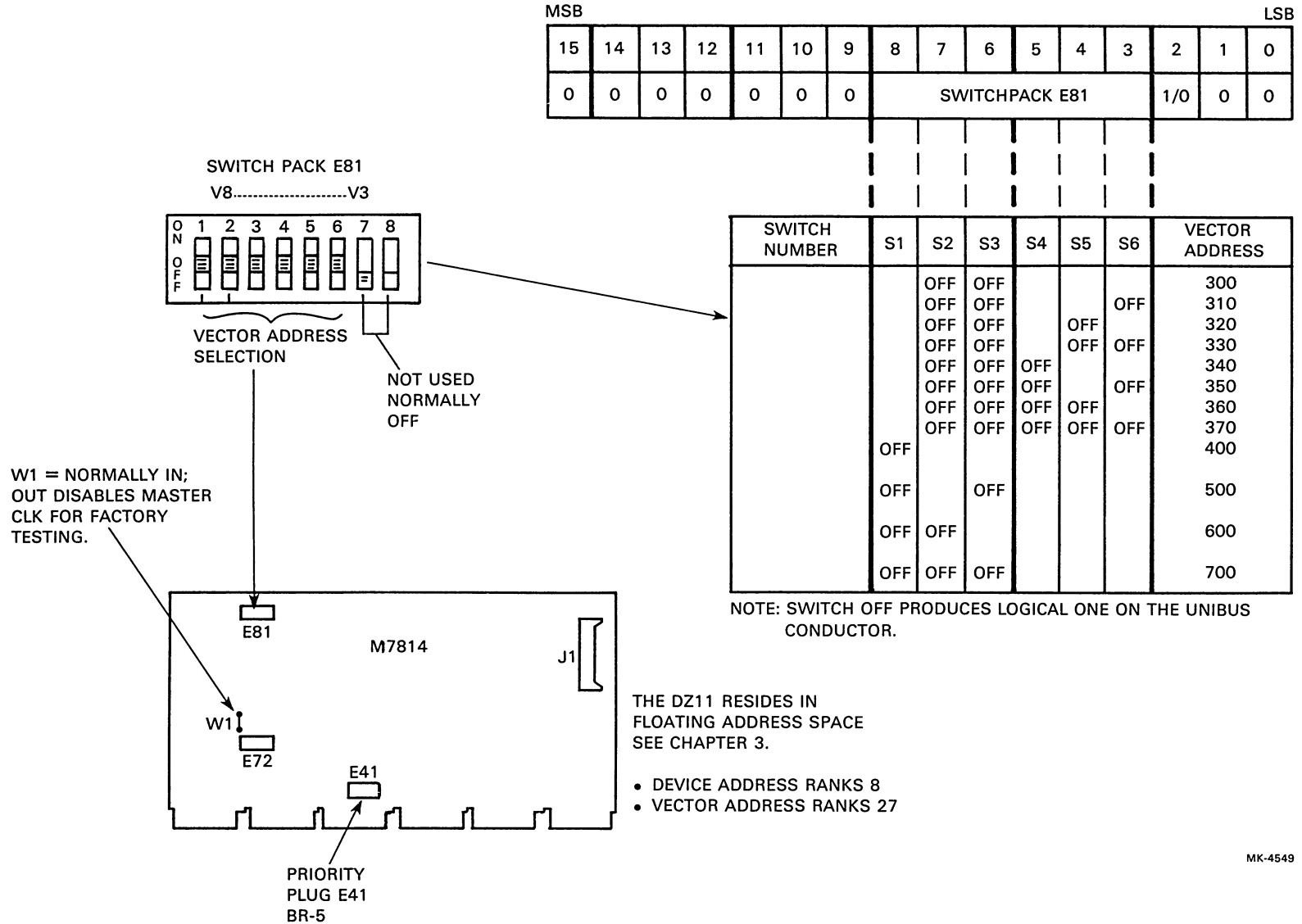


Figure 4-6 M7814 Address and Vector Selection (Sheet 2 of 2)

6. Turn on the system per the System Turn-On Procedure, Figure 2-3.
7. Run the DZ11 diagnostics in the staggered mode to verify module operation. Run a minimum of three passes of EVDAA without error.
8. Remove the BC05W-15 cables from the H3271 test connector. If the DZ11-B is being installed, read Paragraph 4.2.3 for further cabling instructions. If the QMA DZ11 is being installed, read Paragraph 4.2.4 for instructions on installing the H3006 distribution panel.

4.2.2 M7814 Module Installation

1. Turn off the system per Figure 2-4.
2. Check that a BR5 plug (Figure 4-1) has been installed socket E41 of the M7814 module.
3. Set the switches at E72 so that the module will respond to its assigned address. When a switch is closed (on), a binary 1 is decoded. When a switch is open (off), a binary 0 is decoded. Note that the switch labeled 1 corresponds to bit 3, 2 to bit 4, etc. (See Figure 4-6).
4. Vector selection is accomplished by an 8-position switch at E81 on the module(s). When a switch is closed (on), a binary 0 is decoded. When a switch is open (off), a binary 1 is decoded. Note that this is the opposite of the address switch decoding. Also, note that switch positions 7 and 8 are not used and switch 6 corresponds to bit 3, 5 to bit 4, etc.

CAUTION

Insert and remove modules slowly and carefully to avoid snagging module components on the card guides and changing switch settings.

5. Insert module(s) into their assigned SPC slot(s). Connect the BC08S cable, with ribbed side up, to J1 on the module(s).
6. Connect the other end of the BC08S cable, with smooth side up, to the H3190 test connector.
7. Turn on the system per Figure 2-3.
8. Run the DZ11 diagnostics in the staggered mode to verify module operation. Run a minimum of three EVDAA error free passes.
9. Remove the H3190 test connector from the BC08S cable. If the DZ11-D is being installed, refer to Paragraph 4.2.3 for additional cabling instructions. If the QMA DZ11 is being installed, for H3005 distribution panel installation instructions, read Paragraph 4.2.4.

Table 4-2 DZ11 List of Material

Quantity	Description	DZ11	-B	-D	-FA	-FB	-FC	-FD
1	M7819 Module		X		X	X	X	X
1	M7814 Module			X				
2	Static Filters (H7004C)		X					
2	Static Filters (H7004B)			X				
1	H3006 distribution panel				X	X		
1	H3005 distribution panel						X	X
1	BC05W-15 cable		X		X	X		
1	BC08S-15 cable			X			X	X
1	BC06L cable		X					
1	BC06K cable			X				
1	H325 test connector				X			
1	H3271 test connector				X	X		
1	H3190 test connector			X			X	X
1	Print set				X		X	
1	DZ11 Asynchronous Multiplexer User's Guide				X		X	

NOTES:

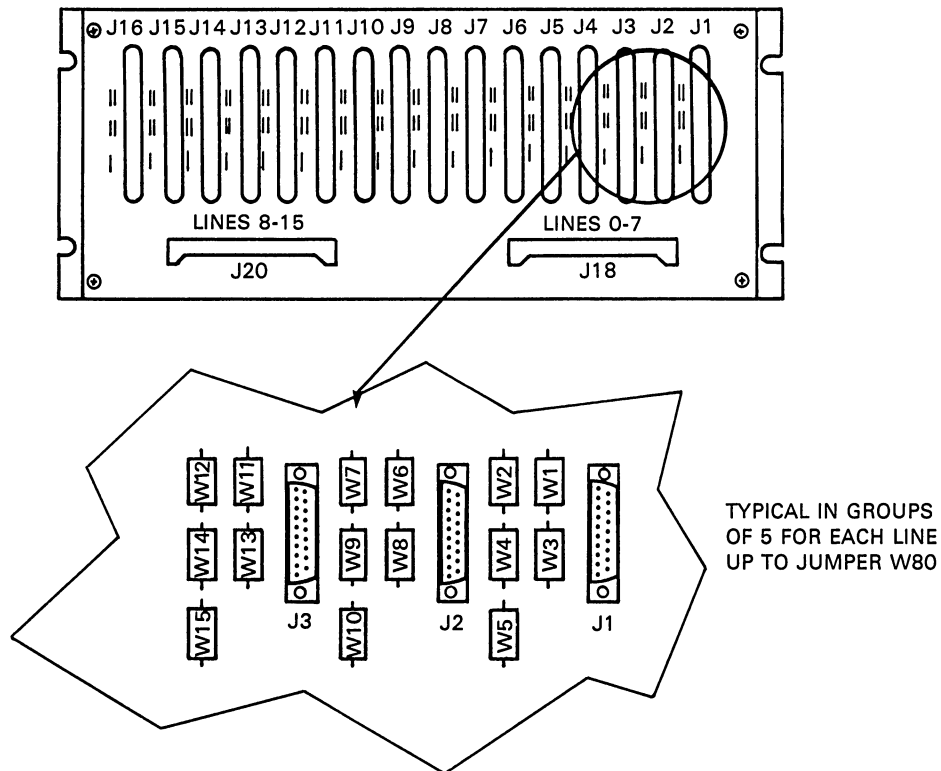
1. DZ11-FA + DZ11-FB = DZ11-FE
2. DZ11-FC + DZ11-FD = DZ11-FF

4.2.3 DZ11-B or DZ11-D to Distribution Panel Connections

The following paragraphs describe the H317-E and H317-F distribution panels to which the DZ11-B AND DZ11-D options are to be connected. The cabling instructions for both options are similar. Therefore, general instructions are given for connecting either option to an H317 distribution panel.

4.2.3.1 H317-E Distribution Panel (EIA Option) – The H317-E 16-port distribution panel is part of the DZ11-A or DZ11-E configuration. The panel is made up of one 16-port module mounted in a cable box assembly. Each 16-port module includes sixteen 25-pin I/O connectors (J1 through J16), two static filters (H7004C), and a number of jumper options.

Inspect the distribution panel to verify that all the machine-insertable jumpers are in place before installing the DZ11-B option. (See Figure 4-7 for jumper locations.) The jumper labeled DTR (refer to 5411928-0-1) connects DTR to pin 4 or Request to Send. This allows the DZ11 to assert both DTR and RTS if using a modem which requires control of RTS. The jumper labeled BUSY is also connected to the DTR lead for use in modems that implement the Force Busy function. This jumper should normally be out unless modem has the Force Busy feature and system software is implemented to control it.



ALL JUMPERS FOR NORMAL CONFIGURATION MUST BE INSTALLED EXCEPT FOR FORCE BUSY (W2, W7, W12, W17, W22, W27, W32, W37, W42, W47, W52, W57, W62, W67, W72, AND W77; THESE JUMPERS MUST BE REMOVED.

MK-4534

Figure 4-7 H317-E (EIA) Distribution Panel Jumper Configuration

4.2.3.2 H317-F Distribution Panel (20 mA Option) – The H317-F 16-port distribution panel is part of the DZ11-C or DZ11-F configuration. The panel is made up of one 16-port module mounted in a cable box assembly. Each 16-port module includes sixteen 4-post terminal connectors (J1 through J16), two static filters (H7004B), and a number of jumper options.

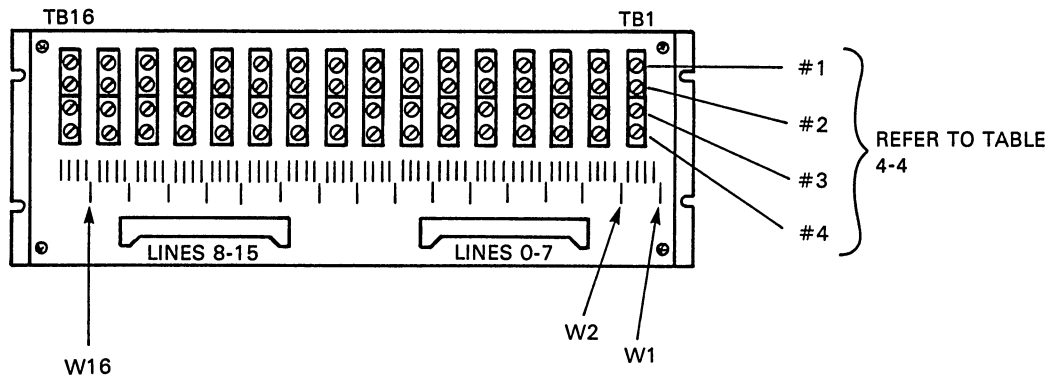
Each line on the H317-F distribution panel has a jumper (W1 through W16) which should be in if the terminal operates at 300 baud or less. The jumper should be removed for higher baud rates. Verify that all machine-insertable jumpers are installed or removed according to the customer's requirements before installing the DZ11-D option. (See Figure 4-8 for jumper locations.)

4.2.3.3 Connecting the DZ11-B or DZ11-D to the H317 –

1. Route the BC05W or BC08S cable from the module through the cabinet to the static filter socket on the rear of the distribution panel.

CAUTION

The cable must be routed and dressed in a manner compatible with the existing cabinet cabling.



THE APPROPRIATE JUMPERS W1-W16 (ONE FOR EACH LINE) MUST BE INSTALLED IF THAT LINE IS OPERATING BELOW 300 B/S. JUMPER MUST BE REMOVED FOR LINES OPERATING HIGHER THAN 300 B/S.

MK-4535

Figure 4-8 H312-F (20 mA) Distribution Panel Jumper Configuration

4.2.4 H3006 and H3005 Distribution Panel Installation

NOTE

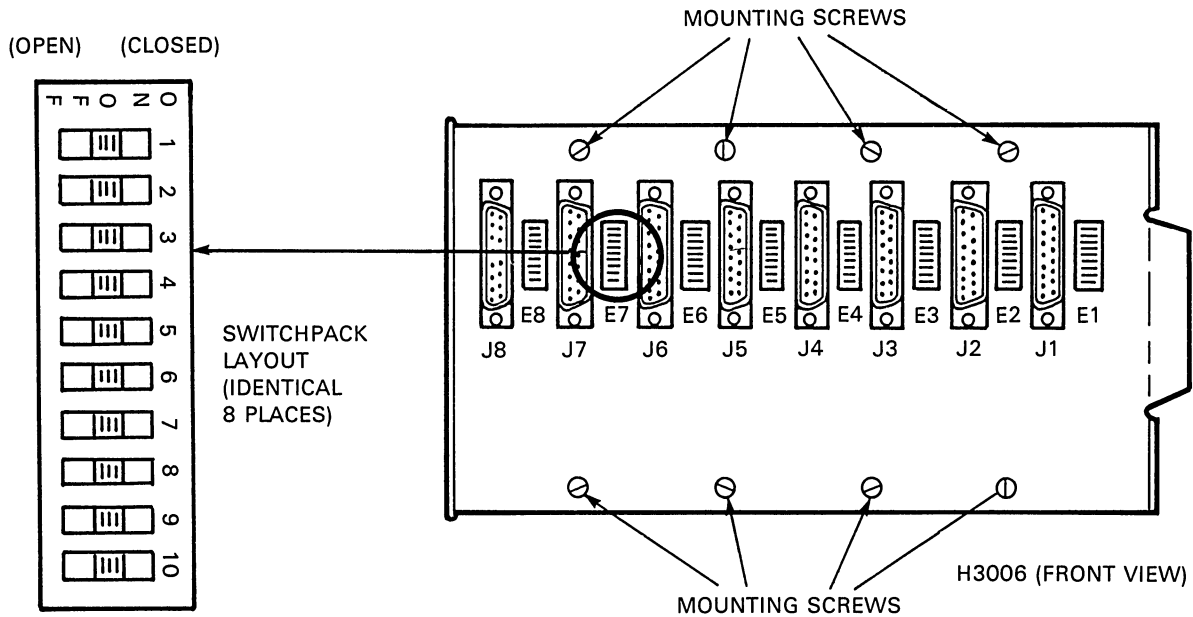
This paragraph briefly describes the I/O bulkhead concept, H3006 and H3005 distribution panels. Because both panels are physically similar, the general installation instructions that follow apply to both the H3006 and H3005.

4.2.4.1 H3006 Distribution Panel (EIA Option) – The H3006 8-port distribution panel is provided as a part of the DZ11-FA or DZ11-FB configuration. Two are provided with the DZ11-FE configuration. The panel consists of one 8-port module mounted on a metal bracket. Each 8-port module includes eight 25-pin I/O connectors (J1 through J8), eight switchpacks (E1 through E8) each with 10 switches, and several jumper options. The H3006 distribution panel is designed to mount in one 20.95 cm (8.25 in) frame of the I/O bulkhead. (See Figure 4-9.)

NOTE

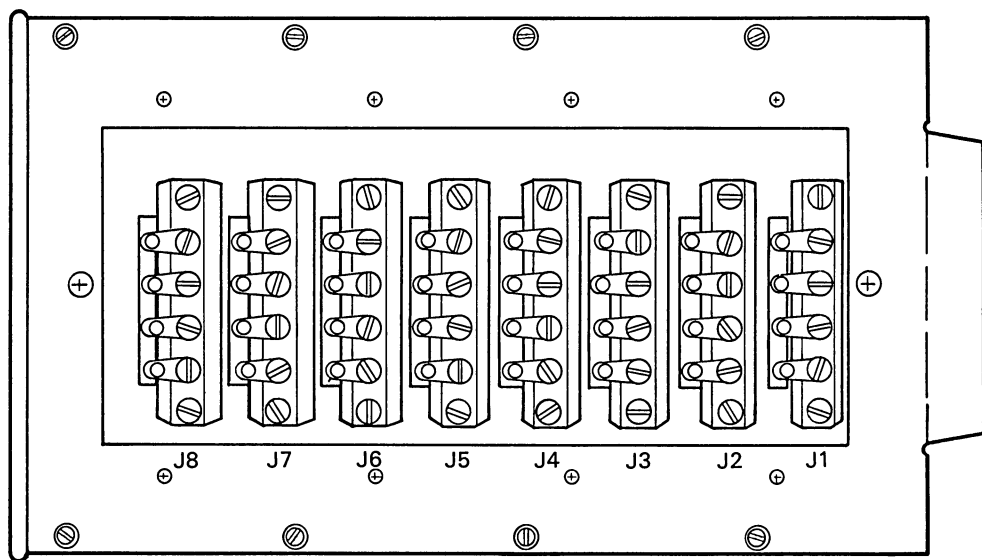
Before installing the H3006 distribution panel, configure the switches as shown in Table 4-3 and then read Paragraph 4.2.4.3.

4.2.4.2 H3005 Distribution Panel (20 mA Option) – The H3005 8-port distribution panel is provided as a part of the DZ11-FC or DZ11-FD configuration. Two are provided with the DZ11-FF configuration. The panel consists of one 8-port module mounted on a metal bracket. Each 8-port module includes eight 4-conductor terminal blocks (J1 through J8). The H3005 distribution panel is shown in Figure 4-10 and is installed in one 20.95 cm (8.25 in) frame of the I/O bulkhead.



MK-4526

Figure 4-9 H3006 Component Location



MK-4527

Figure 4-10 H3005 Component Location

Table 4-3 H3006 Switch Settings

	DF03	Bell 201C™	Bell 208B™	Bell 209A™	Diagnostics & H325
S1					ON
S2					
S3					
S4					
S5					ON
S6					
S7					
S8					
S9					
S10		*			
S11					
S12					
S13					
S14					
S15					

* ON if new synch configured on M7867.

Note: Switches are OFF unless otherwise indicated.

MKV84-0821

4.2.4.3 Distribution Panel Installation in I/O Bulkhead –

CAUTION

Once the distribution panel is installed, there should be no openings (panels omitted) remaining in the I/O frame on the rear of the cabinet which could permit EMI leakage. For this reason, it is necessary to tighten all mounting screws on the distribution panel.

1. Gain access to the I/O bulkhead through the door on the rear of the system cabinet and remove four of the two-inch wide panels from the bulkhead.
2. Route the remaining BC05W or BC08S cable (Figure 4-11) through the cabinet and through the opening in the I/O bulkhead at the rear of the cabinet.

CAUTION

The cable must be routed and dressed in a manner compatible with cable management standards.

3. Plug the Berg™ connector of the BC05W or BC08S cable (smooth side up) into the Berg™ receptacle on the rear of the distribution panel. (See Figure 4-12.)

Bell is a trademark of Western Electric.
Berg is a trademark of Berg Electronics.

4. Install the distribution panel in the opening of the I/O bulkhead in place of the four blank panels which were removed in step 1.

CAUTION

It is necessary to maintain an interference-free environment outside the cabinet enclosure. Any additional panels which may have been removed to facilitate installation if the distribution panel must be replaced.

5. Connect the external cable(s) to the distribution panel. The external cable(s) should exit the cabinet with other signal cables.

CAUTION

BC22D, BC22E, and BC22F cable lengths in excess of 76.2 m (25 ft) may exceed the maximum load capacitance defined by the RS-232-C specification. Note, however, that up to 30 m (100 ft) will provide satisfactory DZ11 performance levels.

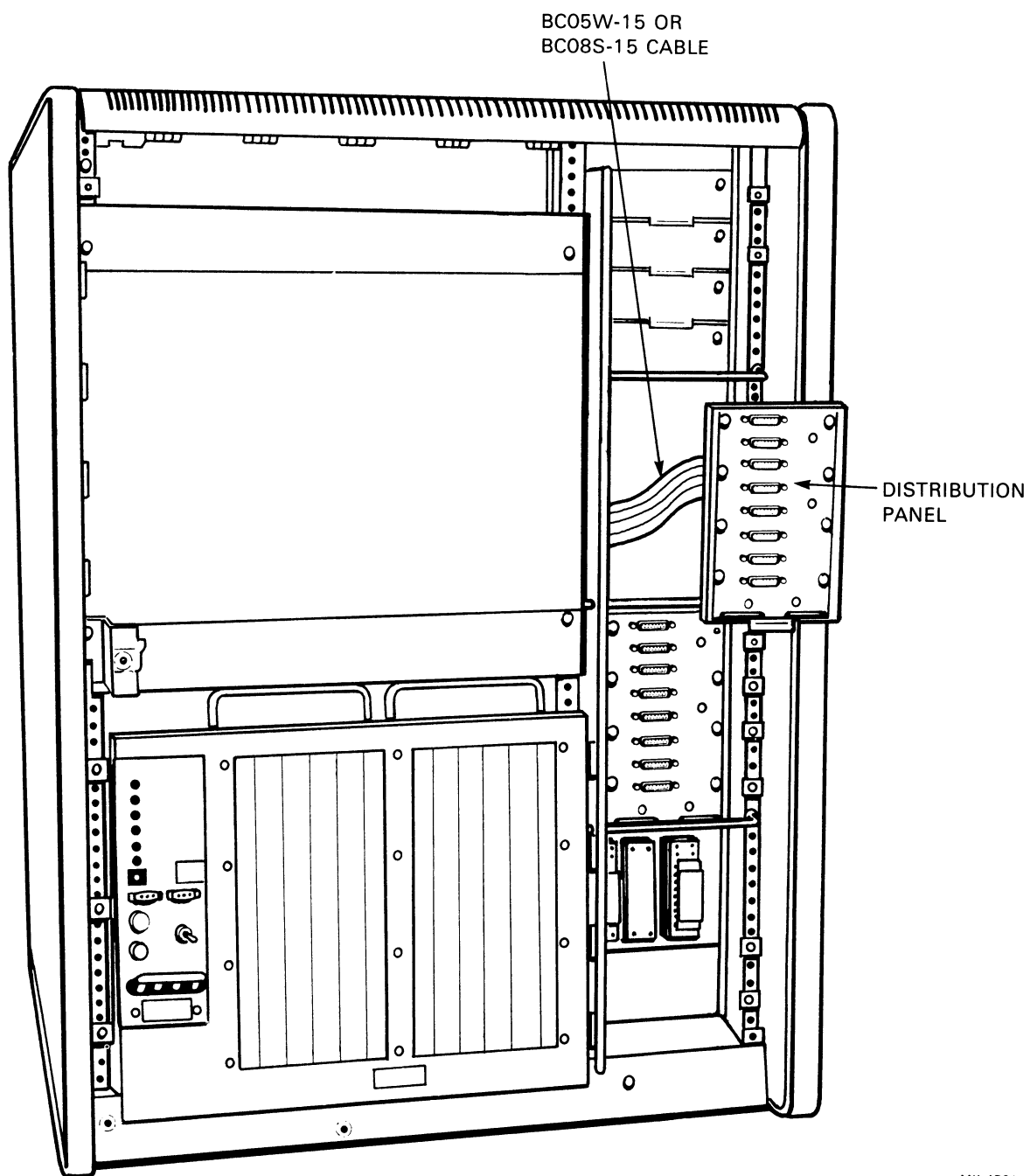
4.2.5 System Testing and Connecting External Equipment

NOTE

The following paragraphs contain instructions for running diagnostics which test the module (M7819 and M7814), internal cabling, distribution panel, and external cabling. Also included are instructions for connecting the external equipment.

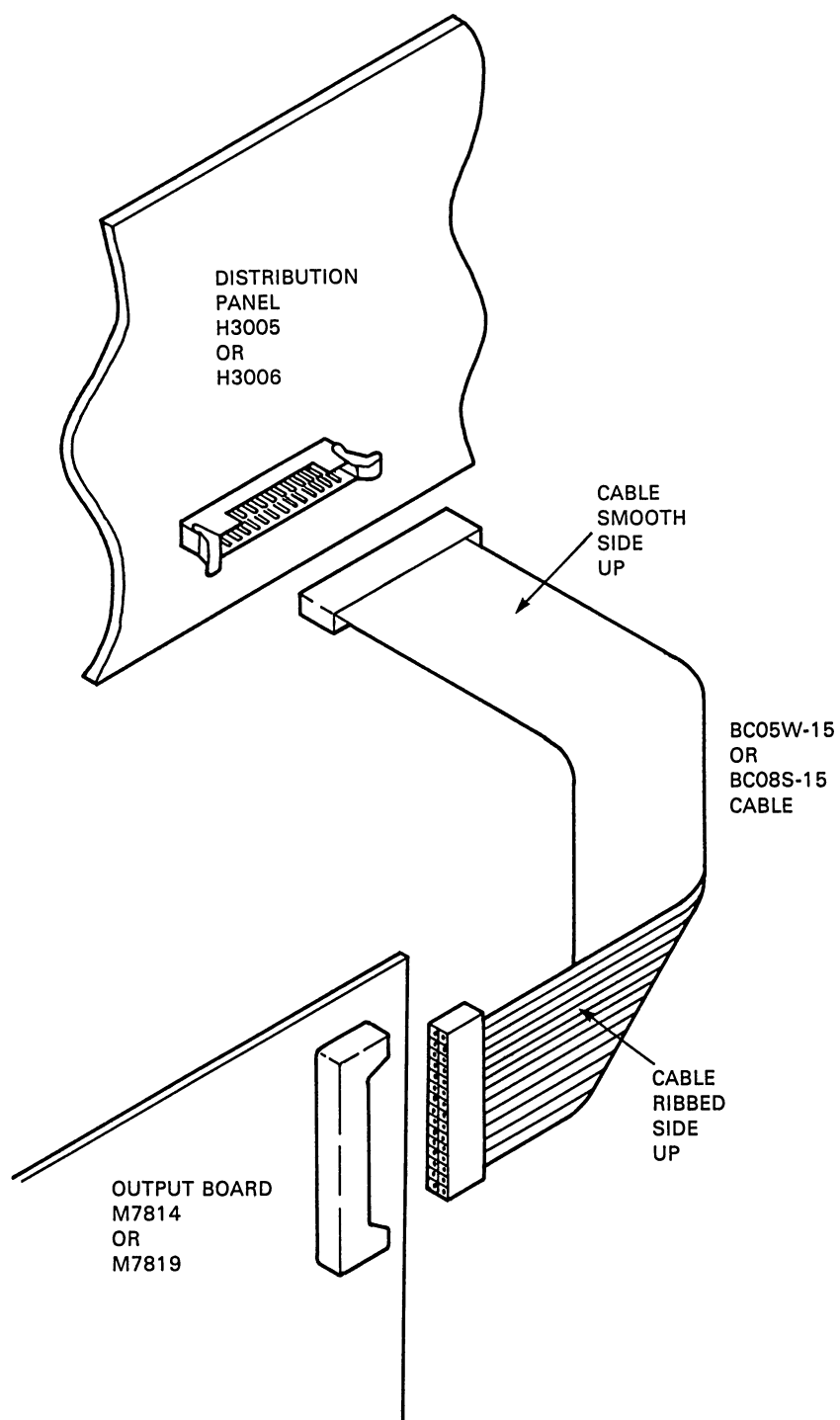
4.2.5.1 M7819 and H317-E or H3006 Configurations (EIA Option) –

1. Connect the H325 test connector to the first line of the distribution panel or to the end of the external cable. If operating with a VAX-11 system connected to a local terminal, run EVTAA*.*. Run EVTBA*.*. for multiterminal connections.
2. Repeat step 1 for each line.
3. Run the DEC/X11 system exerciser (CSCZA**) to verify the absence of UNIBUS conductor interference with other system devices.



MK-4531

Figure 4-11 Installing the Distribution Panel in a Vertical I/O Bulkhead



MK-4543

Figure 4-12 BC05W-15 and BC08S-15 Interconnection with H3006 or H3005 Distribution Panel

4. The DZ11 is now ready for connection to external equipment. If the connection is to a local terminal, a null modem cable must be used. Use the BC03M or BC22D null modem cables for connection between the distribution panel and the terminal. The H312-A null modem cable may also be used with two BC22E or BC22F EIA cables (one on each side of the null modem unit). If connection is to a Bell™ 103 or equivalent modem, a BC22E or BC22F cable is required between the distribution panel and the modem. All of the cables mentioned must be ordered separately because they are not components of a standard DZ11 shipment.

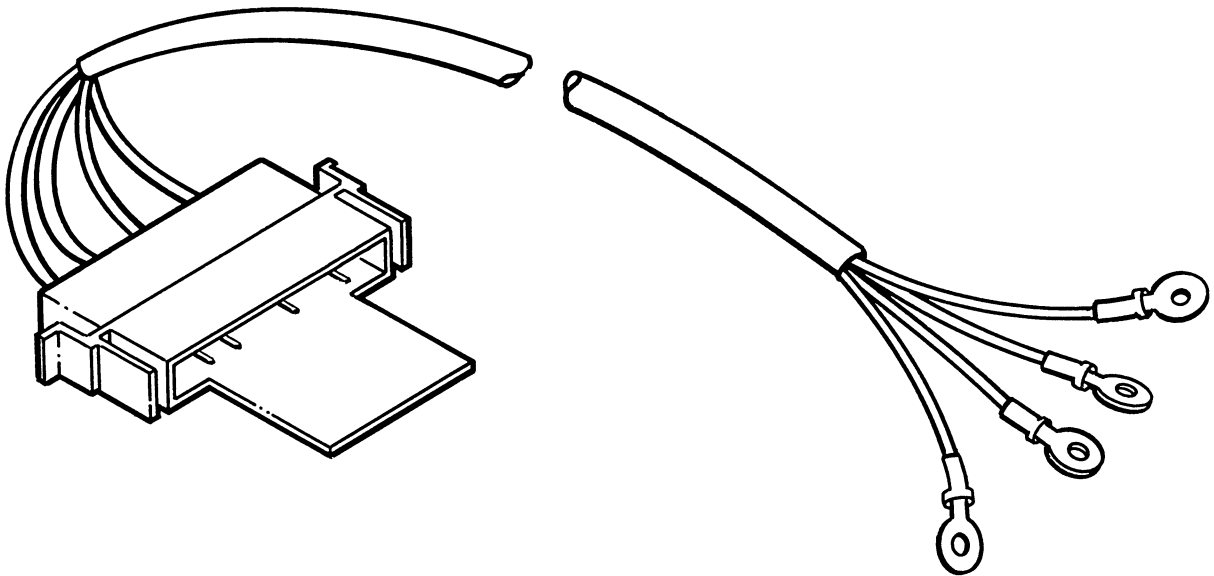
4.2.5.2 H7814 and H3005 Configuration (20 mA Option) –

1. Run the DZ11 diagnostic in echo test mode for three error-free passes. For systems connected to a local terminal, run EVTAA*.*. Run EVTBA*.* for multiterminal connections.
2. The DZ11 is now ready for connection to passive external equipment. This is accomplished with a customer-supplied cable such as the BC04R shown in Figure 4-13. Table 4-4 shows terminal connections for connecting a VT100, LA120, or LA36 to the DZ11. Figure 4-14 shows the H3005 distribution panels respectively, for terminal reference. Run an echo test to verify terminal connections.

NOTE

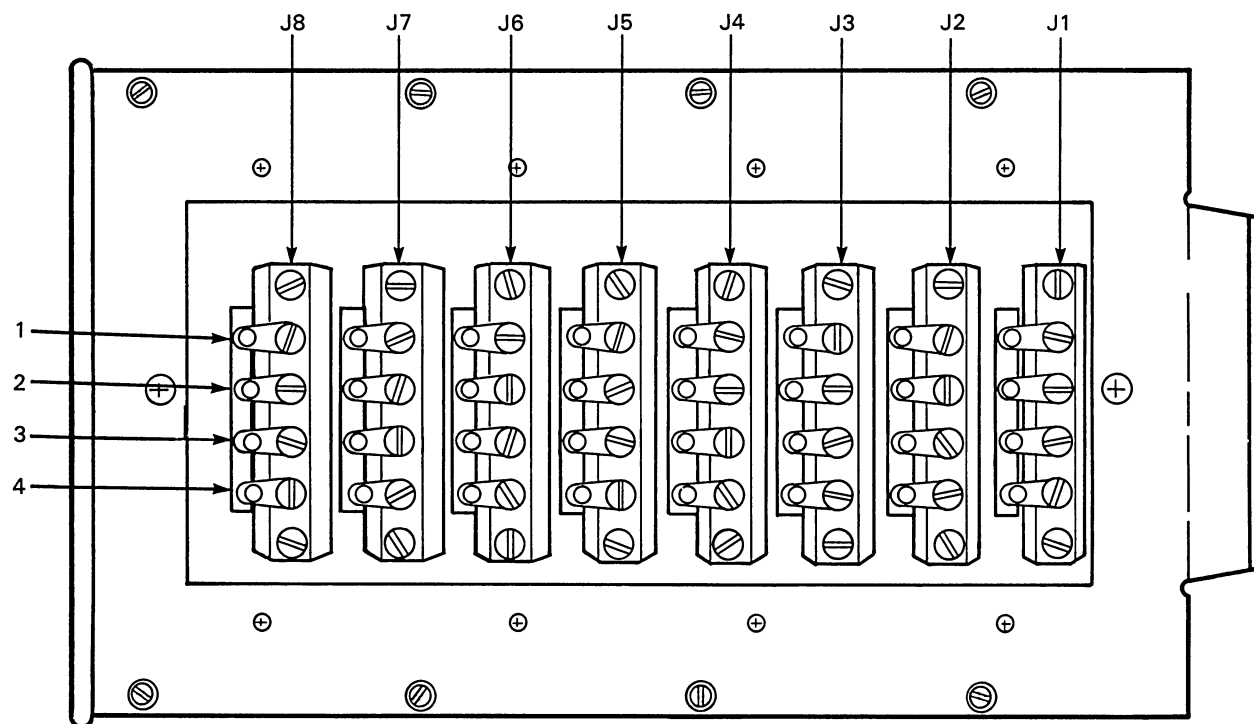
For customer terminals that can only transmit or receive in a single direction, the echo test cannot be run.

If the DZ11 is connected to an active device, a pair of H319s is required.



MKV84-0822

Figure 4-13 BC04R Cable



MK-4538

Figure 4-14 H3005 Distribution Panel Terminal Reference

Table 4-4 DZ11 to Terminal Wiring (Using BC04R Cable)

VT100 Wiring

Mate-N-Lok™	VT100 Signal	Color	H317 or H3005 Terminal No.
5	Terminal +RCV	Black	4(XMIT+)
2	Terminal –RCV	White	3(XMIT–)
3	Terminal –XMIT	Green	2(REC–)
7	Terminal +XMIT	Red	1(REC+)

LA120, LA36 Wiring

Mate-N-LOK™	LA120, LA36 Signal	Color	H317F or H3005 Terminal No.
5	Terminal +XMIT	Black	1(REC+)
2	Terminal –XMIT	White	2(REC–)
3	Terminal –REC	Green	3(XMIT–)
7	Terminal +REC	Red	4(XMIT+)

NOTE

Terminal RCV is connected to DZ11 XMIT. Terminal XMIT is connected to DZ11 RCV. Polarity should always be + to + and – to – for both XMIT and RCV.

In addition, post 1 is located at the top of the terminal block on the distribution panel and goes in sequence to post 4 at the bottom of the terminal block.

Mate-N-Lok is a trademark of AMP, Inc.

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CHAPTER 5

DW750 UNIBUS ADAPTER INSTALLATION

5.1 GENERAL

The DW750 is a self-contained UNIBUS Adapter (UBA) module that is used to implement a second UNIBUS. VAX-11/750 systems can accommodate a maximum of one additional UBA for a system total of two UNIBUS buses.

It is installed in one of three general-purpose I/O adapter slots. Also, an expansion box and a UNIBUS Options Cabinet are required for installation of the options that interface with the DW750.

5.2 INSTALLATION PREREQUISITE

5.2.1 System Turn-Off

Turn off the system per Figure 2-4.

5.2.2 CPU Hardware Revision Level Check

Examine the CPU hardware revision level per EVNDX to ensure compatibility between the option and the CPU.

5.3 INSTALLATION

1. Install the expansion box or cabinet.

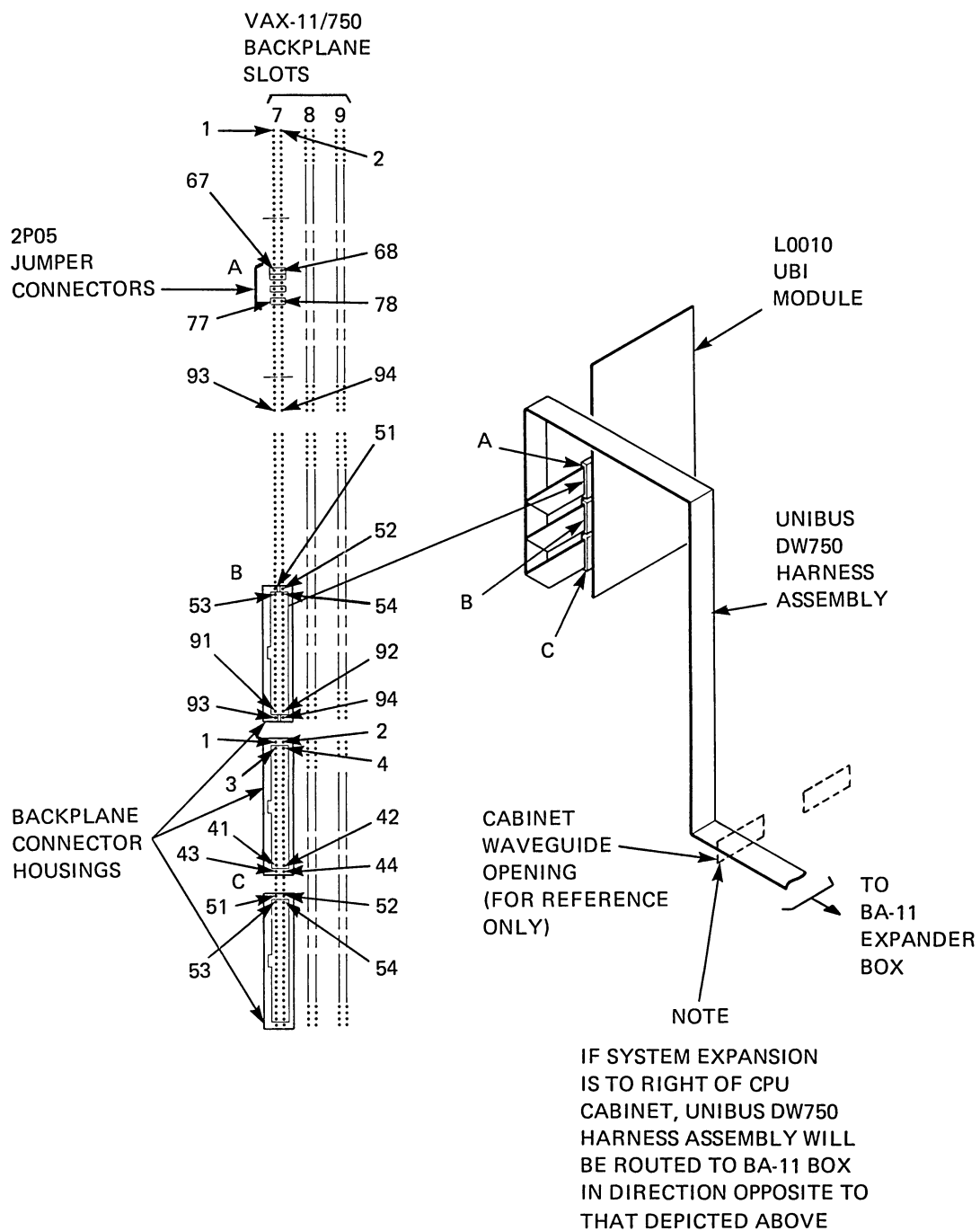
NOTE

The expansion box should be installed on the left side of the CPU cabinet (facing the CPU cabinet).

2. Install the VELOSTAT™ kit per Chapter 3.
3. Unpack the option kit per Chapter 3.
4. Install the L0010 module (Figure 5-1) in a CMI option slot 7, 8, or 9.

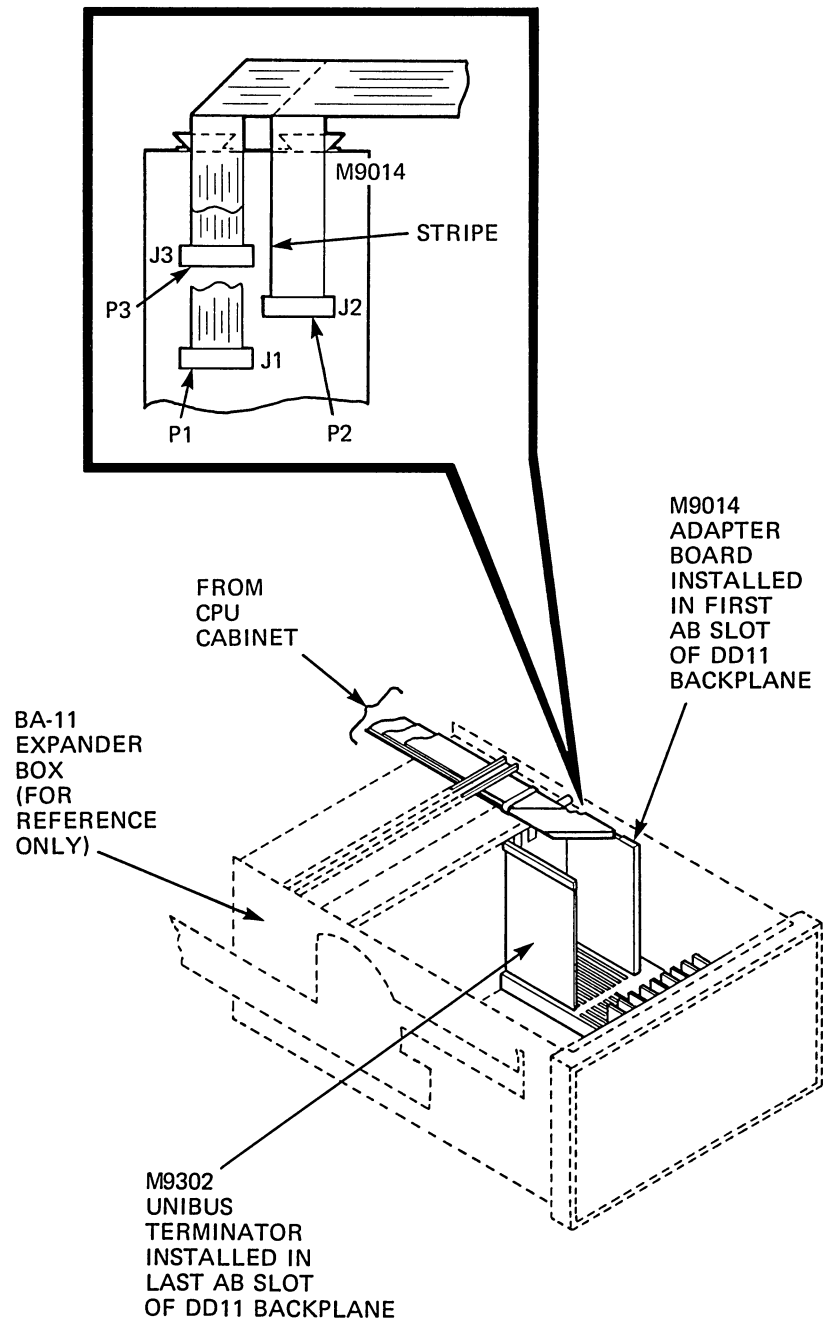
NOTE

The first CMI option slot (7) is recommended to alleviate cabling problems.



MKV84-0995

Figure 5-1 DW750 Installation Details (Sheet 1 of 2)



MKV84-0823

Figure 5-1 DW750 Installation Details (Sheet 2 of 2)

5. Remove the grant jumpers from the backplane slot where the L0010 has been installed.

NOTE

No jumpers need to be added to the DW750 option because it has a fixed address and a fixed CMI arbitration level of 3.

RH750s start with a CMI arbitration level of 3. If the system includes one or more RH750, their arbitration levels must be lowered by one.

Without a DW750 installed:

RH750 0 address F28000 CMI arbitration level 3
RH750 1 address F2A000 CMI arbitration level 2

With DR750 installed:

RH750 0 address F28000 CMI arbitration level 3
RH750 1 address F2A000 CMI arbitration level 1

6. Connect the three ribbon cables (Figure 5-1) to backplane slots A, B, C.
7. Route the cable assembly up the backplane, across the cable tray, and then down inside the expander cabinet to the expander box.
8. Install the M9014 adaptor board on the end of the cable assembly.
9. Install the M9014 in the expansion box UNIBUS IN slot (first AB slot of the DD11 backplane).
10. Install the UNIBUS options that are going on the second UNIBUS (DW750) per the applicable instruction manual.
11. Install the M9302 UNIBUS terminator module in the last AB slot of the DD11 backplane.
12. Install a UNIBUS exerciser module M7855 into an SPC slot in the expansion box DD11 backplane.
13. Remove the NPG jumper wire (CA1 to CB1) in the backplane slot where the M7855 has been installed.

NOTE

M7855 address must be selected for 770000 and the vector set for 510.

Switches	Address (E 125)	Vector (E 88)
S1	ON	ON
S2	ON	ON
S3	ON	ON
S4	ON	ON
S5	ON	OFF
S6	ON	OFF
S7	ON	ON
S8	ON	OFF

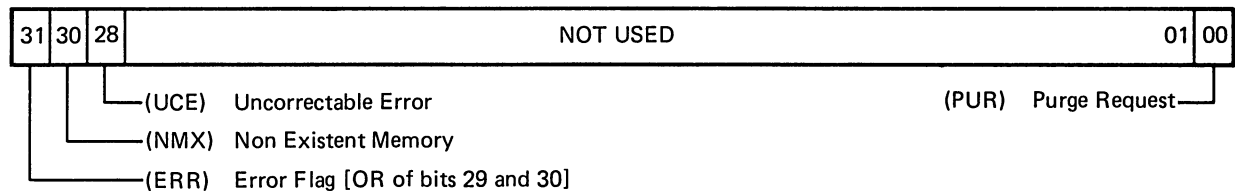
5.4 HARDWARE CHECKOUT

5.4.1 System Turn-On

Turn on the system per Figure 2-4 and examine the L0010 UBI Module Data Path Registers. There are three buffer data path registers, and they are at the following addresses.

CSR1 F32004
 CSR2 F32008
 CSR3 F3200C

Figure 5-2 illustrates format of each of the registers.

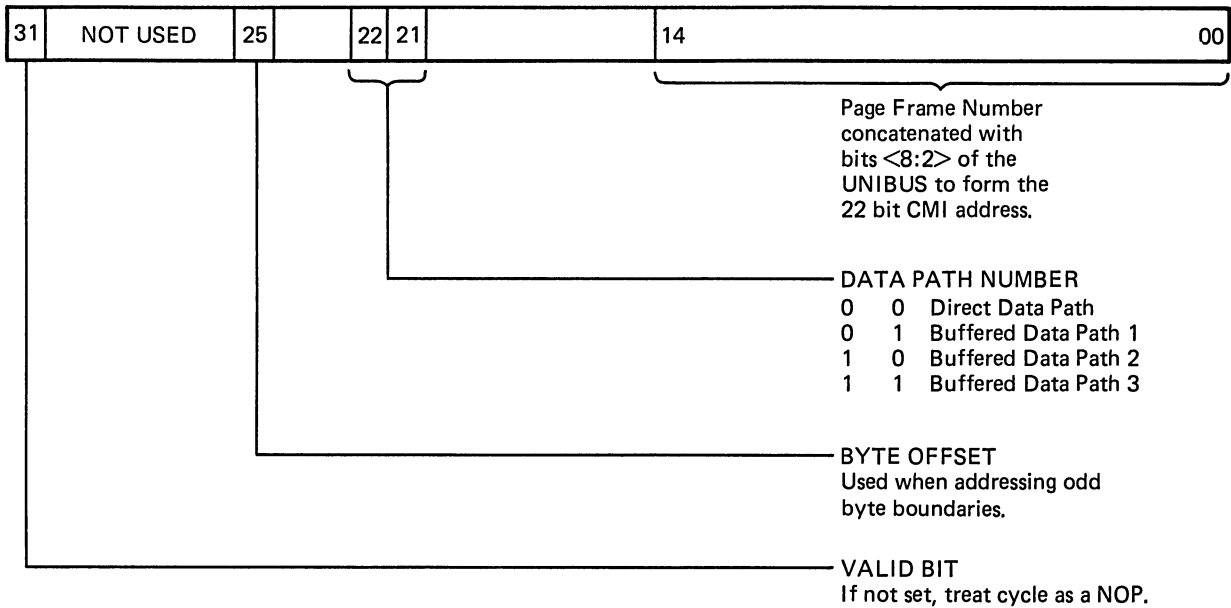


TK-11259

Figure 5-2 L0010 UBI Module Data Path Registers Bit Format

5.4.2 Examine Some of the L0010 UBI Module Map Registers

They fall into the addresses between F32800 and F32FFC. Figure 5-3 illustrates the format of the map registers.



TK-11258

Figure 5-3 Map Registers Format

5.4.3 Examine the IPEC Registers

These registers are similar in function to the UET registers of the UBI module. They are physically located on the L0010 module, but accessed via the SUB's UNIBUS. Therefore, if you can examine these registers, you have proven you can access the second UNIBUS and it is not hung.

IPEC Registers	CMI Address	UNIBUS Address
Address register	FBF460	772140
Data register	FBF462	772142
Control register 1	FBF464	772144
Control register 2	FBF466	772146

NOTE

When examining or depositing these registers, use word-length format rather than long-word format.

Ex: E/W FBF460

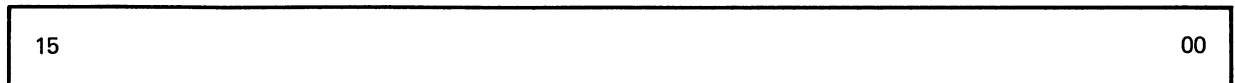
5.4.3.1 Address Register FBF460 – Figure 5-4 illustrates the format of the Address Register FBF460. This register contains sixteen of the address bits used during an NPS transfer initiated by control register 1. The upper two bits, 16 and 17, are contained in control register 1.



TK-11260

Figure 5-4 Address Register FBF460 Bit Format

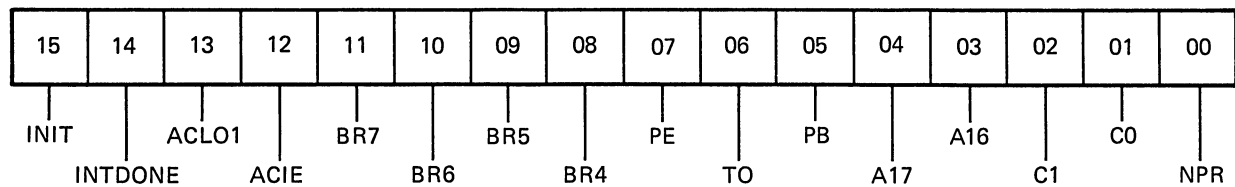
5.4.3.2 Data Register FBF462 – Figure 5-5 illustrates the bit format of Data Register FBF462. This register has a dual function. For an NPR cycle it contains the data either sent or received by the NPR. For a BR cycle it contains the vector passed with the interrupt.



TK-11261

Figure 5-5 Address Register FBF462 Bit Format

5.4.3.3 Control Register 1 FBF464 – Figure 5-6 illustrates the bit format of Control Register 1 at address FB4464.



NPR – Setting this bit causes the device to do an NPR cycle with the data contained in the address and data registers. If the bit fails to clear, it indicates that the device was unable to become bus master. This bit is also cleared by INIT.

C0, C1 – These bits determine what type of transfer will be done when NPR is set. They are as follows.

C1	C0	
0	0	DATI
0	1	DATIP
1	0	DATO
1	1	DATOB

A17-A16 – These bits are the upper two bits of the address register. INIT does not clear these bits.

PB – Setting this bit simulates a memory parity error setting the BUS PB signal on the UNIBUS when the data register is read. This bit is cleared by INIT.

TO – This bit indicates that a UNIBUS transfer “timed out”, SSYN was not returned. It is relocked every transfer, and cleared by INIT. READ ONLY.

PE – This bit indicates that BUS PB on the UNIBUS occurred during a DATI. It is relocked every DATI cycle, and also cleared by INIT. READ ONLY.

BR7-BR4 – These four bits cause the device to assert their respective BR requests, and attempt to interrupt at that level. They may be set in any combination to verify the arbitration logic. Once these bits are set the IPEC will attempt to interrupt until either the bit is cleared or the interrupt has taken place. These bits are not cleared by the interrupt taking place, and must be explicitly cleared by either writing a zero to the appropriate bit position, or by INIT before they can be set again to initiate another interrupt.

ACIE – This bit is ACLO Interrupt Enable. When set will cause an interrupt to vector 1E4 on the leading edge of a UNIBUS ACLO signal (power going down) and again approximately 100 ms after the trailing edge of ACLO (power coming up). Cleared by INIT.

ACLO1 – This bit is set by power fail conditon, and causes an interrupt if ACIE is set. READ ONLY.

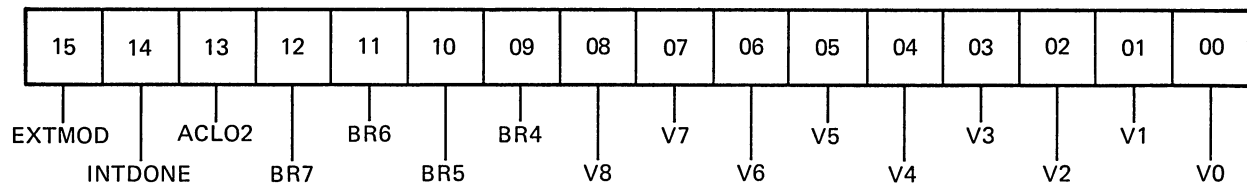
INTDONE – This bit indicates an interrupt caused by one of the BR bits being set has taken place. This bit is cleared by writing a (1) to it or by INIT.

INIT – This bit will initialize the internal logic of the IPEC when set. The output is undefined when read.

TK-11256

Figure 5-6 Control Register 1 Bit Format

5.4.3.4 Control Register 2 FBF466 – Figure 5-7 illustrates the bit format of Control Register 2, located at CMI address FBF466.



V8:V0 - These bits specify the vector to be used by an interrupt initiated by Control Register 2. These bits are not cleared by INIT.

BR7:BR4 - These bits cause the device to interrupt in the same manner as the BR bits in Control Register 1. Cleared by INIT.

ACLO2 - This bit when set will cause ACLO on the UNIBUS to be asserted for approximately 1.5 ms. The bit is self clearing. This bit is NOT affected by INIT.

INTDONE - This bit works like the INTDONE bit in Control Register 1, but for interrupts initiated by the BR bits in Control Register 2. This bit is cleared by writing a 1 to it or by INIT.

EXTMOD - This bit is reserved for future use, should be zero when read. READ ONLY.

TK-11257

Figure 5-7 Control Register 2 Bit Format

5.4.4 UBE Register Examination

Examine location FBF000; this gives you location 770000 on the second UNIBUS. For a description of what the bits in the UBE registers do, consult the user's manual.

By examining a UBE register, you are checking that you can get out to the BA box.

5.5 DIAGNOSTICS

1. Boot up the diagnostic supervisor in standalone mode.

NOTE

The minimum revision of the Diagnostic Supervisor that can be used is (6.4).

Ex: B/10 XXXX

Where (XXXX) is the boot device.

2. Attach the DW750 by either running the autosizer program EVSBA or by doing a manual attach.

EX:1

```
DS> RUN EVSBA
DS> SELECT ALL
```

EX:2

```
DS> ATTACH DW750 CMI DW1
DS> ATTACH UBE DW1 UB0 770000 510
DS> SELECT DW1
DS> SELECT UB0
```

3. Run a minimum of two passes of the UBI/DW750 Diagnostic program ECCBA, which should be REV 1.3 or higher.

EX:

```
RUN ECCBA
```

4. Run appropriate diagnostics for devices on the Sub. Run whatever other appropriate diagnostics are necessary to verify the peripherals that were added to the DW750's UNIBUS. These diagnostics can be determined by referring to the installation manuals for the added devices, looking them up in EVNDX, or by using the Diagnostic Supervisor help file as follows:

EX:

```
DS> HELP DEV XXXX
```

Where (XXXX) is the device you want to test.

5. Remove the UBE module, making sure to replace the NPG jumper wire on the backplane (wire from pins CA1 to CB1 in slot where M7855 is installed), and the grant card back in its original slot (slot D of an SPC slot).
6. Bring up VMS and run UETP.
7. Return the system to the customer.

CHAPTER 6

FP750 FLOATING-POINT ACCELERATOR INSTALLATION

6.1 FP750 INSTALLATION PROCEDURE

1. Turn off the system power.
2. Unpack the FP750.
3. Install the FP750 in CPU slot 1.
4. Turn on the system power.

6.2 FP750 DIAGNOSTICS

Verify operational integrity of the FP750 by running diagnostic program EVKAC, level 2.

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CHAPTER 7

H7112 BATTERY BACK-UP OPTION INSTALLATION

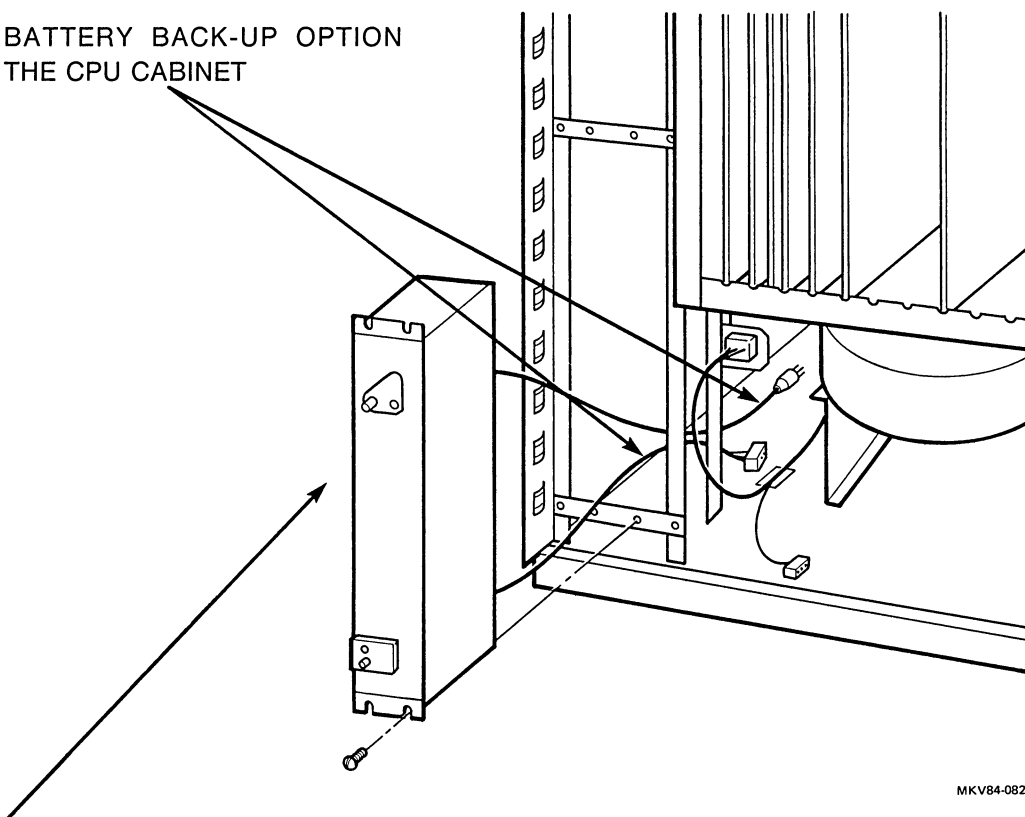
7.1 GENERAL

The H7112 battery back-up option can supply power to a maximum operating MOS memory subsystem for a minimum of 10 minutes.

7.2 INSTALLATION

1. Turn off the system per Figure 2-4.
2. Install the battery back-up option per Figure 7-1.

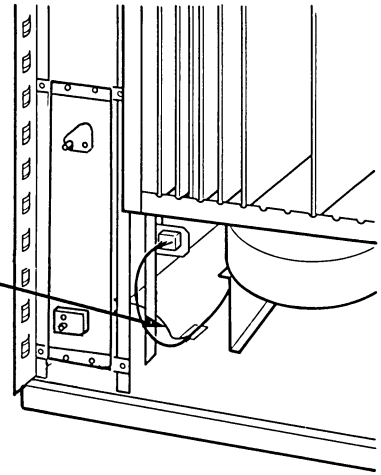
- ① USING A HEX WRENCH, UNLATCH AND THEN REMOVE THE CPU CABINET BACK COVERS, AND UNLATCH AND OPEN THE FRONT DOOR
- ② ROUTE THE BATTERY BACK-UP OPTION CABLES INTO THE CPU CABINET



- ③ INSTALL THE BATTERY BACK-UP OPTION AND SECURE IT WITH FOUR SCREWS

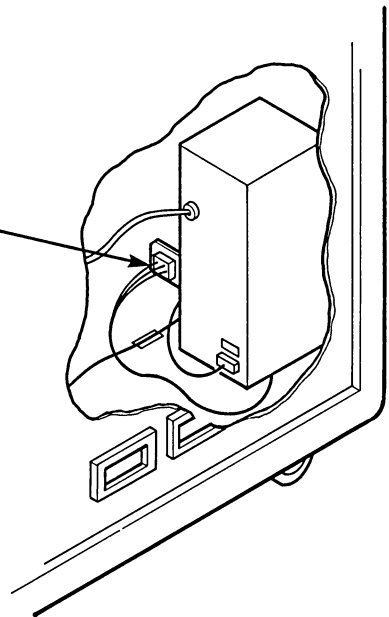
Figure 7-1 Battery Back-Up Assembly Installation Procedure
(Sheet 1 of 2)

- 4 ROUTE THE 3-WIRE CABLE (P4) AROUND THE BACK OF THE BATTERY BACK-UP OPTION, AND CONNECT P4 TO ONE OF THE TWO 3-PIN JACKS ON THE BATTERY BACK-UP OPTION



MKV84-1005

- 5 CONNECT THE BATTERY BACK-UP OPTION CABLE TO J1 ON THE BATTERY CONNECTOR MOUNTING PLATE



MKV84-0825

- 6 CONNECT THE AC POWER CABLE TO JACK J16 ON THE 875A POWER CONTROLLER
- 7 CLOSE THE CABINET FRONT DOOR AND LATCH IT, USING A HEX WRENCH
- 8 REINSTALL THE CABINET BACK COVERS AND LATCH THEM, USING A HEX WRENCH

Figure 7-1 Battery Back-Up Assembly Installation Procedure
(Sheet 2 of 2)

7.3 BATTERY BACK-UP OPERATIONAL VERIFICATION

The H7112 battery-backup unit can be functionally verified by running the ECKAX diagnostics under manual intervention (SEC:MANUAL). This diagnostic requires power interruption through manual intervention; after the battery pack has been completely charged, the site ac power distribution panel circuit breaker assigned to the VAX-11/750 CPU is set to the OFF position. The battery-backup unit should keep memory valid and return the diagnostic to a normal completion cycle. To verify proper operation of the battery-backup unit, perform the following procedure.

1. Turn on the system per Figure 2-3.
2. Insert a tape containing program ECSAA into the TU58 tape slot on the CPU console.
3. At the console terminal, type

B DDA0

Then press RETURN. The console terminal will print

%%

Then, after approximately 2-1/2 minutes, the console terminal will print the following:

DIAGNOSTIC SUPERVISOR. ZZ-ECSAA-5.3-113
1-JAN-1980 00:00:00.00 DS>

4. Remove the ECSAA program tape from the TU58 tape slot.
5. Insert a tape containing program ECKAX into the TU58 tape slot.
6. At the console terminal, type

ATT KA750 (MI KA0 NO NO YES 0 0

Then press RETURN.

7. At the console terminal, type

SEL KA0

Then press RETURN.

8. At the console terminal, type

RU ECKAX/SE:MAN/TE:3

Then press RETURN. After approximately one minute, the console prints the following:

PROGRAM:VAX-11/750 Specific CPU Cluster Exerciser – ZZ-ECKAX-1, REV 1.0, 9 TEST TESTING:
_KA0

Is this system equipped with a battery backup?

(If no, then set the front-panel switch to the HALT position.)

[(NO), YES]

9. At the console terminal, type

YES

Then press RETURN. The console terminal will print the following:

Before continuing, set the front-panel switch to HALT/RESTART

Good Restart Parameter Block Subtest – This subtest will restart itself if the RPB is properly interpreted. Throw the breaker switch to power fail ...

10. Set the site ac power distribution panel circuit breaker assigned to the VAX-11/750 CPU to the OFF position. Then set the circuit breaker ON. The console terminal will print the following:

%%

Bad Checksum Subtest – This subtest will halt the processor with a halt code of 11. After this has happened the subtest is restarted by typing S 100 <CR> on the console terminal. Throw the breaker switch to power fail ...

11. Set the site ac power distribution panel circuit breaker assigned to the VAX-11/750 CPU to the OFF position. Then set the circuit breaker to ON position. The console terminal will print the following:

%%

00000000 11

>>>

12. At the console terminal, type

S 100

Then press RETURN. The console terminal will print the following:

Search for Good RPB – This subtest will restart itself if the good RPB is found and interpreted properly. Throw the breaker switch to power fail.

13. Set the site ac power distribution panel circuit breaker assigned to the VAX-11/750 CPU to the OFF position. Then set the circuit breaker to ON position. The console terminal will print the following:

%%

Warm Start Flag Subtest – This subtest will halt the processor with a halt code of 12. After this has happened the subtest is restarted by typing S 100 <CR> on the console terminal. Throw the breaker switch to power fail ... Before power fail, set front-panel switch to the HALT position.

14. Set the site ac power distribution panel circuit breaker assigned to the VAX-11/750 CPU to the OFF position. Then set the circuit breaker to ON position. The console terminal will print the following:

%%

00000000 12

>>>

15. Set POWER ON ACTION switch on control panel at HALT position.
16. At the console terminal, type

S 100

Then press RETURN. The console terminal will print the following:

NOTE

The front-panel switch must be in the HALT position for this test to operate properly.

HALT expected with following printout:

00006136 06

To continue from console mode, do the following:

D/G F 100 <CR> and then C <CR>

00006136 06

>>>

17. At the console terminal, type

D/G F 100

Then press RETURN.

18. At the console terminal, type

C

Then press RETURN. The console terminal will print the following:

HALT expected with following printout:

0000633F 04

To continue from console mode, do the following:

D/G F 100 <CR> and then C <CR>

0000633F 04

>>>

19. At the console terminal, type

D/G F 100

Then press RETURN.

20. At the console terminal, type

C

Then press RETURN. The console terminal will print the following:

HALT expected with following printout:

0000650C 04

To continue from console mode, do the following:

D/G F 100 <CR> and then C <CR>

0000650C 04

>>>

21. At the console terminal, type

D/G F 100

22. At the console terminal, type

C

Then press RETURN. The console terminal will print the following:

HALT expected with the following printout:

00006688 0A

To continue from console mode, do the following:

D/G F 100 <CR> and then C <CR>

00006688 0A

>>>

23. At the console terminal, type

D/G F 100

Then press RETURN.

24. At the console terminal, type

C

Then press RETURN. The console terminal will print the following:

HALT expected with following printout:

00006808 0A

To continue from console mode, do the following:

D/G F 100 <CR> and then C <CR>

00006808 0A

>>>

25. At the console terminal, type

D/G F 100

Then press RETURN.

26. At the console terminal, type

C

Then press RETURN. The console terminal will print the following:

HALT expected with the following printout:

00006988 0A

To continue from console mode, do the following:

D/G F 100 <CR> and then C <CR>

00006988 0A

>>>

27. At the console terminal, type

D/G F 100

Then press RETURN.

28. At the console terminal, type

C

Then press RETURN. The console terminal will print the following:

HALT expected with following printout:

00006B08 0A

To continue from console mode, do the following:

```
D/G F 100 <CR> and then C <CR>  
00006B08 0A  
>>>
```

29. At the console terminal, type

```
D/G F 100
```

Then press RETURN.

30. At the console terminal, type

```
C
```

Then press RETURN. The console terminal will print the following:

```
..END OF RUN. 0 ERRORS DETECTED. PASS COUNT: 1. TIME: (CURRENT) DS>
```

31. The test is now complete. Remove ECKAX program tape from TU58 tape slot.

CHAPTER 8

G & H FORMAT MICROCODE INSTALLATION

8.1 KU750 INSTALLATION PROCEDURE

1. Turn off the system per Figure 2-4.
2. Remove the L0008-YA module from CPU slot 5 and replace it with an L0008-YB module.
3. Turn on the system per Figure 2-3.

8.2 KU750 DIAGNOSTICS

The KU750 is tested by running tests 5 and 6 of diagnostic ECKAX after the system has been brought up in stand-alone mode under the DIAGNOSTIC SUPERVISOR.

NOTE

The diagnostics will only test hardware functionality.

If either of these tests fails, verify that the installation is correct and/or replace the L0008-YB module.

Example 8-1 shows how to attach the CPU. The '23FF' parameter is the optional control store last microcode address.

```
00000000 16
>>>B/10
%%
```

```
DIAGNOSTIC SUPERVISOR. ZZ-ECSAA- 6.10-322 14-JUL-1982 15:03:19
DS> ATTACH KA750 CMI KA0 NO NO YES 23FF 0
DS> SET TRA
DS> SEL ALL
DS> RUN ECKAX/TE:5:6
```

```
.. PROGRAM: VAX 11/750 Specific CPU Cluster Exerciser -
ZZ-ECKAX-4.0, revision 4.0, 11 tests,
  at 15:05:08.84.
Testing: _KA0
```

```
Test 5: WCS Memory Test
Test 6: WCS Execution Test
.. End of run, 0 errors detected, pass count is 1,
  time is 14-JUL-1982 15:06:13.08
DS>
```

Example 8-1 Attaching the CPU

8.3 KU750 SOFTWARE INSTALLATION AND TESTING

The VMS utility KU750UTL.EXE loads the G and H floating-point microcode into the WCS. KU750UTL with the G and H floating-point microcode binary files and related routines are installed into the operating system the same way optional software is installed. The command procedure in the [SYSUPD] area, called VMSUPDATE.COM, automatically loads the KU750 optional software into the appropriate directories. The tape bears a label of KU750KIT and a command procedure of the same name. The tape must be physically installed in the TU58 tape drive when VMSUPDATE is invoked. VMSUPDATE reads the tape and gets the KU750KIT command procedure, which installs the G and H software into the appropriate places on the system. When KU750KIT completes execution, it returns control back to VMSUPDATE. VMSUPDATE then optionally terminates at the operator's request. Once the installation is complete, the package may be tested a number of ways. Next, the customer must decide what type of power failure recovery is desired. Then the command procedures that invoke the desired recovery may be created.

8.3.1 Software Installation

1. Load the KU750KIT tape into the console tape drive CS1:.
2. Boot the system and log into the FIELD SERVICE account.
3. Set the default directory to SYS\$SYSDISK: [SYSUPD].
4. Invoke the VMSUPDATE command procedure by typing...

\$ @VMSUPDATE

5. Respond to the questions, and the procedure will run on its own until completion.
6. Example 8-2, Installation Command Procedures, illustrates installation command procedures that will be typed out on the terminal.

NOTE

This account must have privileges to run the KU750 utility.

```

Username: SYSTEM
Password:
Welcome to VAX/VMS Version X2.2
$ set def sys$sysdisk:[sysupd]
$ @vmsupdate

```

VMS Update Procedure

This command procedure performs VAX/VMS software updates and optional software installations for VAX/VMS Release 2. During this sequence, the standard console medium will not be present in the console drive. Therefore, the system may be vulnerable to a power failure or other fatal crash. If a system crash should occur during this period the update sequence can be restarted at the beginning of the first incomplete update.

```

Dismount the current console medium.
%SYSTEM-F-DEVNOTMOUNT, device is not mounted

```

Please place the first volume in the console drive

```

Are you ready to continue?: yes
%MOUNT-I-MOUNTED, KU750KIT      MOUNTED ON _CSA1:
$COPY/LOG SYS$KIT:*. *      [SYSUPD]*
%COPY-S-COPIED, _CSA1:[SYSUPD]EXAMPLE.COM;2 copied to _DRA0:[SYSUPD]EXAMPLE.COM;14 (2 blocks)
%COPY-S-COPIED, _CSA1:[SYSUPD]GHFLOAT.BIN;6 copied to _DRA0:[SYSUPD]GHFLOAT.BIN;6 (21 blocks)
%COPY-S-COPIED, _CSA1:[SYSUPD]GHFLOAT.ULX;5 copied to _DRA0:[SYSUPD]GHFLOAT.ULX;15 (96 blocks)
%COPY-S-COPIED, _CSA1:[SYSUPD]GHOFF.BIN;1 copied to _DRA0:[SYSUPD]GHOFF.BIN;13 (21 blocks)
%COPY-S-COPIED, _CSA1:[SYSUPD]KU750BIN.COM;3 copied to _DRA0:[SYSUPD]KU750BIN.COM;15 (1 block)
%COPY-S-COPIED, _CSA1:[SYSUPD]KU750BLD.COM;2 copied to _DRA0:[SYSUPD]KU750BLD.COM;14 (1 block)
%COPY-S-COPIED, _CSA1:[SYSUPD]KU750DRV.MAR;4 copied to _DRA0:[SYSUPD]KU750DRV.MAR;4 (23 blocks)
%COPY-S-COPIED, _CSA1:[SYSUPD]KU750DRV.OBJ;1 copied to _DRA0:[SYSUPD]KU750DRV.OBJ;1 (4 blocks)
%COPY-S-COPIED, _CSA1:[SYSUPD]KU750IPC.COM;1 copied to _DRA0:[SYSUPD]KU750IPC.COM;1 (1 block)
%COPY-S-COPIED, _CSA1:[SYSUPD]KU750KIT.COM;17 copied to _DRA0:[SYSUPD]KU750KIT.COM;18 (3 blocks)
%COPY-S-COPIED, _CSA1:[SYSUPD]KU750NHK.COM;3 copied to _DRA0:[SYSUPD]KU750NHK.COM;16 (1 block)
%COPY-S-COPIED, _CSA1:[SYSUPD]KU750MAC.COM;2 copied to _DRA0:[SYSUPD]KU750MAC.COM;2 (1 block)
%COPY-S-COPIED, _CSA1:[SYSUPD]KU750MDL.MAR;1 copied to _DRA0:[SYSUPD]KU750MDL.MAR;1 (2 blocks)
%COPY-S-COPIED, _CSA1:[SYSUPD]KU750MSG.OBJ;3 copied to _DRA0:[SYSUPD]KU750MSG.OBJ;3 (5 blocks)
%COPY-S-COPIED, _CSA1:[SYSUPD]KU750OFF.COM;2 copied to _DRA0:[SYSUPD]KU750OFF.COM;14 (1 block)
%COPY-S-COPIED, _CSA1:[SYSUPD]KU750OPT.OPT;1 copied to _DRA0:[SYSUPD]KU750OPT.OPT;1 (1 block)
%COPY-S-COPIED, _CSA1:[SYSUPD]KU750PRC.MAR;3 copied to _DRA0:[SYSUPD]KU750PRC.MAR;3 (25 blocks)
%COPY-S-COPIED, _CSA1:[SYSUPD]KU750PRC.OBJ;1 copied to _DRA0:[SYSUPD]KU750PRC.OBJ;1 (5 blocks)
%COPY-S-COPIED, _CSA1:[SYSUPD]KU750TST.COM;7 copied to _DRA0:[SYSUPD]KU750TST.COM;7 (1 block)
%COPY-S-COPIED, _CSA1:[SYSUPD]KU750TST.MAR;30 copied to _DRA0:[SYSUPD]KU750TST.MAR;30 (31 blocks)
%COPY-S-COPIED, _CSA1:[SYSUPD]KU750TST.OBJ;29 copied to _DRA0:[SYSUPD]KU750TST.OBJ;29 (16 blocks)
%COPY-S-COPIED, _CSA1:[SYSUPD]KU750UTL.MAR;19 copied to _DRA0:[SYSUPD]KU750UTL.MAR;19 (76 blocks)
%COPY-S-COPIED, _CSA1:[SYSUPD]KU750UTL.OBJ;4 copied to _DRA0:[SYSUPD]KU750UTL.OBJ;4 (19 blocks)
%COPY-S-NEWFILES, 23 files created
$!
$DISMOUNT/NOUNLOAD SYS$KIT
$! This command file assembles all types of the load utility
$@KU750MAC
$MACRO KU750MDL +KU750UTL/OBJ=KU750UTL

```

Example 8-2 Installation Command Procedures
(Sheet 1 of 2)

```

$MACRO KU75OMDL +KU75OPRC/OBJ=KU75OPRC
$MACRO KU75OMDL +KU75ODRV/OBJ=KU75ODRV

$! This command file links all types of the KU750 load utility
$! All EXEs are created in [SYSEXE]
$! All .MAR,.OBJ (except KU75OMSG),.EXE
$! in the running area have been deleted
$@KU75OLNK
$LINK KU75OUTL,KU75OMSG/EXE=[SYSEXE]KU75OUTL
$LINK KU75ORPC,KU75OMSG/EXE=[SYSEXE]KU75OPRC
$LINK KU75ODRV,KU75OPT.OPT/OPTIONS,-
      SYS$SYSTEM:SYS.STB/SELECTIVE_SEARCH/EXE=[SYSEXE]KU75ODRV
BASE=0
$LINK-W-USRTFR, Image '[SYSEXE]KU75ODRV' has no user transfer address
$DELETE KU75OUTL.*;*
$DELETE KU75OPRC.*;*
$DELETE KU75ODRV.*;*
$DELETE KU75OPT.*;*
$! This command file links theIPC test package
$! for the GHFLOAT installation verification.
$@KU75OTST
$LINK KU75OTST,KU75OMSG/EXE=[SYSEXE]KU75OTST
$DELETE KU75OTST.OBJ;*
$!
$! This is the test file to run for verification
$!
$COPY KU750IPC.COM [SYSTEST]*
$DELETE KU750IPC.COM;*
$! This copies the GHFLOAT microcode binary file to the
$! correct area
$!
$COPY GHFLOAT.BIN [SYSEXE]*
$!
$! This deletes the file from the running area
$!
$DELETE GHFLOAT.BIN;*
$!
$SET NOVERIFY
  At this point it is necessary to select the
  appropriate type of loading of UCS for the installation.
  EXAMPLE>COM gives sample command files for each type.
  The correct type should be built into a file named
  GHFLOAT.COM in [SYSMGR] and an entry made in the
  SYSTARTUP file i.e., @[SYSMGR]GHFLOAT.COM

  All source files for the KU750 utilities are on this
  update kit if you wish to modify them.
%SYSTEM-F-DEVNOTMOUNT, device is not mounted

Are there more kits to process?: NO

  Please place the system console medium in the console drive.

Are you ready to continue?: YES

%MOUNT-I-MOUNTED, CONSOLE      mounted on _CSA1:
Requested update sequence is complete.
$

```

Example 8-2 Installation Command Procedures
(Sheet 2 of 2)

8.3.2 KU750 Software Testing

1. Test the software by typing the commands shown in the following diagnostic printout example, per Example 8-3.

NOTE

The account must be a privileged account.

The command sequence shows that the symbol “CS” is equated to running the KU750UTL.EXE program in the [SYSEXEC] area.

2. The command sequence in Example 8-3, DCL Commands, shows that symbol “CS” is equated to running the KU750UTL.EXE program in the [SYSEXEC] area.

```
$ CS==SYS$SYSTEM:KU750UTL
$ CS [SYSEXEC]GHFLOAT.BIN/LOAD/BIN
$ @[SYSTEST]KU750IPC
%UCSMMSG-I-INSTOK, GH instructions loaded successfully
$ SET DEF [SYSMAINT]
$ RUN ECSAA
DIAGNOSTIC SUPERVISOR. ZZ-ECSAA-6.1-175  4-MAR-1981  17:40:48
DS> ATT KA750 CMI KAO YES YES YES 23FF 0
DS> SET TRA
DS> SEL ALL
DS> RUN EVKAC
.. Program: VAX Floating Point Instructions Exerciser, ZZ-EVKAC, REV 3.0, 4 TESTS, AT 17:41:40
TESTING: _KAO

TEST 1: Single Precision Floating Point Instructions
TEST 2: Double Precision Floating Point Instructions
TEST 3: Extended Range Double Precision Floating Point Instructions
TEST 4: Extended Range Quadruple Precision Floating Point Instructions
.. END OF RUN. 0 ERRORS DETECTED. PASS COUNT: 1. TIME: 4-MAR-1981 17:47:46.50
DS>
```

Example 8-3 DCL Commands

3. The following line shows a filespec with two switches following it.

```
CS [SYSEXEC]GHFLOAT.BIN/BIN/LOAD
```

This input instructs the KU750 utility to load the WCS with a packed binary image file called GHFLOAT.BIN. The /BIN switch instructs the utility that it is a binary file; the /LOAD switch indicates that WCS must be loaded.

4. The next command line invokes a test routine that verifies the G and H instructions (Example 8-4; G and H Instruction Test Routine).

```

$ ty ghfloat.com
$ ! GHFLOAT.COM WCS utility command procedure
$ CS:==$SYS$SYSTEM:KU750UTL
$ CS [SYSEXE]GHFLOAT.BIN/BIN/LOAD
$ EXIT
$

```

Example 8-4 G and H Instruction Test Routine

5. For thorough testing, run the VAX floating-point instruction exerciser EVKAC. The ATTACH statement for the processor specifies G and H floating-point instructions and the WCS last address as 23FF.

8.3.3 System Start-Up Command Procedure Modification

1. A modification to the site specific command procedure ([SYSMGR]SYSTARTUP.COM) should be made if the customer desires the optional control store to be loaded at bootstrap time.
2. Example 8-5, Run KU750 Utility, shows a command procedure to run the KU750 utility and the input arguments.

```

$ ty [systest]ku750ipc.com
$RUN [SYSEXE]KU750TST
$

```

Example 8-5 Run KU750 Utility

3. Example 8-6 shows a site-specific, start-up command file that will automatically invoke the KU750 utility and load the OCS. The command procedure in [SYSTEST], called KU750IPC, runs the program [SYSEXE]KU750TST. If that program runs successfully, the following message is printed at the terminal:

```
%UCSMMSG-I-INSTOK, GH instructions loaded successfully
```

Refer to Example 8-3 for the format of the [SYSTEST]KU750IPC.COM command file.

4. A command procedure called EXAMPLE.COM, left in the [SYSUPD] area after installing the KU750KIT, shows some of the powerfail recovery options available.
5. Example 8-7, Cold Boot, shows a cold boot using the site-specific command procedure shown in Example 8-6, Start-Up Command File.

%%

VAX/VMS Version V2.2 9-NOV-1980 12:00

Opcom, 4-MAR-1981 1709:57.27, logfile initialized,
operator=_OPA0:

%UCSMSG-I-INSTOK, GH instructions loaded successfully

Batch,SYSTEM 17:10:19.01
"VAX 11/750 Proto 26 - VAX/VMS Initialized"

Login quotas - Interactive limit=64, Current interactive value=0

SYSTEM job terminated at 4-MAR-1981 17:10:22.93

Example 8-7 Cold Boot

6. The KU750 option installation is now completed.

```

$ ty systartup.com
$ ! **** Maintainability Engineering System Startup ***
$ !
$ MC SYSGEN
CONNECT CONSOLE
$ !
$ ! Set terminal speeds and types
$ !
$ SET TERM TTA0: /PERM /SPEED=9600 /VT52
$ SET TERM TTA1: /PERM /SPEED=9600 /VT100
$ SET TERM TTA2: /PERM /SPEED=300 /LA36
$ SET TERM TTA3: /PERM /SPEED=9600 /VT100
$ SET TERM TTA4: /PERM /SPEED=9600 /VT100
$ SET TERM TTA5: /PERM /SPEED=9600 /VT100
$ SET TERM TTA6: /PERM /SPEED=300 /VT100
$ SET TERM TTA7: /PERM /SPEED=1200 /VT100
$ !
$ ! Make random system definitions
$ !
$ DEFINE/SYS      SYS$MANAGER      SYS$SYSDISK:[SYSMGR]
$ DEFINE/SYS      NET$LIBRARY      WRKD$:[NETLIB]
$ ASSIGN/SYS      SYS$LIBRARY:     EDT$CAI
$ !
$ ! Start batch and printer queues
$ !
$ INIT/QUEUE/BATCH SYS$BATCH/JOB=5/PRI=2
$ START/QUEUE SYS$BATCH
$ !
$ SET PRINTER LPA0: /LOWER
$ SET DEVICE/SPOOLED=LPA0 LPA0
$ ASSIGN/SYSTEM LPA0 SYS$PRINT
$ INIT/QUEUE/FLAG LPA0
$ START/QUEUE LPA0
$ !
$ ! Load G and H Floating Ucode into WCS
$ !
$ @[sysmgr]ghfloat.com
$ !
$ ! Test G and H Floating Ucode
$ !
$ @[systest]ku750ipc
$ !
$ ! Announce the system is up
$ !
$ REPLY/ALL/BELL "VAX 11/750 Proto 26 - VAX/VMS Initialized"
$

```

Example 8-6 Start-Up Command File

CHAPTER 9

MS750 EXPANSION MEMORY INSTALLATION

9.1 GENERAL

The MS750-C/D is the expanded-memory system for the VAX-11/750. It increases the memory capacity of the VAX-11/750 from a maximum of two megabytes to eight megabytes. This memory system comprises an L0016 controller module and up to eight M8750 array modules. Each M8750 array module contains one megabyte of memory. The minimum version of VMS needed to use this memory expansion capability is 3.0.

CAUTION

The MS750-C/D memory system modules have components that can be damaged by electrostatic discharge (ESD). DO NOT handle modules without using a VELOSTAT™ kit (CD kit A2-W0299-10). See Chapter 3.

NOTE

In the examples used in this procedure, commands typed by the user are underlined.

9.2 FUNCTIONAL

The L0016 memory controller operates synchronously with the CMI bus clock and uses the CMI bus protocol. It provides timing and control for three types of memory cycles. It contains the logic for ECC and refresh operations required by the MOS RAMs, as well as bootstrap and initialization functions. It provides data used for error logging and diagnostics under software control. The memory controller also determines the number and types of arrays present and makes address space contiguous.

The MS750-C/D memory system operates in a class B environment.

The M8750 is the same as the M8728, except for the MOS RAMs and +12 V and -5 V support logic.

The L0016 is similar to the L0011. The main difference is that it contains a new gate array pattern using the DC650 MAD chip. The DC650 can be used to replace the MAP DC632C gate array on the L0011 memory controller. However, the MAP chip should be used on the L0011 whenever possible. The MAP chip WILL NOT work on the L0016 memory controller.

9.3 INSTALLATION

CAUTION

Like all VAX-11/750 modules, the MS750 contains electrostatic discharge sensitive (ESDS) components. Use the VELOSTAT™ kit to prevent damage to these components. (This damage may not be immediately apparent.)

To install the MS750-C/D memory system, first bring the operating system down in an orderly manner. In a system running VMS, type the following (operator privileges are needed to execute this command):

\$ @SYS\$SYSTEM:SHUTDOWN

9.3.1 CPU and Backplane Revision Levels

Examine the SID register to determine the revision levels of the CPU and backplane. With the system in console mode, type the following:

>>> E/I 3E

The system response will be as follows:

I 0000003E 0200ZZXY

└─┬─┘
 └─┘ ZZ = CPU microdiagnostic revision

where

X = CPU revision level (minimum for memory upgrade is revision 4)

Y = Backplane revision level

0 = Revision B

8 = Revision C (required for memory upgrade)

If the response is FF in the CPU and backplane revision level positions, use the charts and procedure in the following sections to determine the CPU and backplane revision levels.

9.3.2 MS750-C/D Installation on Systems with Revision B Backplanes

NOTE

Memory upgrade kit MS750-DC is required with revision B backplanes. This kit contains the following:

1. Backplane, revision C (70-16486)
2. SID switch module (54-15142)
3. L0016 memory controller
4. M8750 memory array

CHAPTER 10

RH750 MASSBUS ADAPTER

INSTALLATION

10.1 RH750 INSTALLATION PROCEDURE

1. Unpack the RH750 per the unpacking instructions in Chapter 3.

CAUTION

The electrostatic discharge installation kit procedure of Chapter 3 must be performed during unpacking and installation of the RH750 to prevent component parts from being damaged by electrostatic discharges.

2. Turn off the system per the System Turn-Off Procedure, Figure 2-4.
3. Obtain the device address and CMI arbitration information for the RH750 option from the manufacturing configuration sheet.
4. Install jumpers on the CPU backplane for the CMI request level (CMI ARB), device address (MBA select) and a jumper for SLOW CMI EN H, according to Figure 10-1 and Table 10-1.

NOTE

Table 10-1 lists recommended jumper configurations.

Table 10-1 RH750 Jumper Configurations

MBA #	Address	CMI ARB	SLOT	MBA Select <1:0>
0	F28000	3	9	00
1	F2A000	2	8	01
2	F2C000	1	7	10
MBA Select <0> = 0 Jumper installed from X00A54 to X00A52 (GND)				
= 1 Jumper removed from X00A54 to X00A52				
MBA Select <1> = 0 Jumper installed from X00A53 to X00A51 (GND)				
= 1 Jumper removed from X00A53 to X00A51				

5. Verify that a priority plug (Figure 10-2) has been properly plugged into the L0007 module. This priority plug determines the BR level and also part of the vector address. The vector address is also determined in part by the device number. Also verify that it is of the correct BR level; typically, it will be BR5.
6. Insert the L0007 module into the designated slot (Figure 10-3).

NOTE

Preferably the first or the only RH750 is installed in Slot 9 so that as additional RH750s are added, the cables can be placed on the top of existing cabling. Refer to Figure 10-4.

7. Remove the CMC gate array module (L0011 or L0016) from backplane slot 10.
8. Install the A9-01 Boot ROM (Part No. 23908A9-00) in socket A, B, C, or D or the L0011 module (Figure 10-5) or the L0016 module (Figure 10-6) per Table 10-2.

NOTE

The VAX-11/750 bootstrap ROMs are located on the memory controller module (L0011 or L0016). The ROMs are plugged into sockets so that they can be removed and/or relocated. A UNIBUS disk system is operational without the factory placement of the bootstrap ROMs (Table 10-2) being altered.

RH750 installation involves installation of the RH750 A9-01 ROM (Part No. 23908A9-00) on the memory controller module (L0011 or L0016). This MASSBUS disk ROM may be installed in either the location that corresponds to the CPU console BOOT DEVICE switch position D, or all of the bootstrap ROMs may be arranged to a customer-preferred boot switch position configuration. The only requirement is that the TU58 bootstrap ROM remain on the memory controller module, preferably in either socket position A or D.

Table 10-2 Factory Placement of Bootstrap ROMs

Boot Device Switch Position	Device Type
A	TU58
B	RL02
C	RK07
D	Empty

9. Remove and discard the I/O bulkhead plate and securing hardware from where the RH750 MASSBUS connector hardware will be installed (Figure 10-7).
10. Install the RH750 MASSBUS connector hardware.
11. Install the RH750 cable assembly (Figure 10-3).

NOTE

Note the orientation of the red stripe on the three ribbon cables.

12. Loosen the adjustable collar on the BC17-M shielded MASSBUS cable and connect the cable to the appropriate I/O panel MASSBUS receptacle.
13. Inspect the MASSBUS terminator on the MASSBUS drive. If the terminator contains three register cards, then check that W2 (MASSBUS FAIL H) on the cable C terminator card has been removed.
14. Plug the MASSBUS terminator into the MASSBUS receptacle drive assembly.

10.2 RH750 DIAGNOSTICS

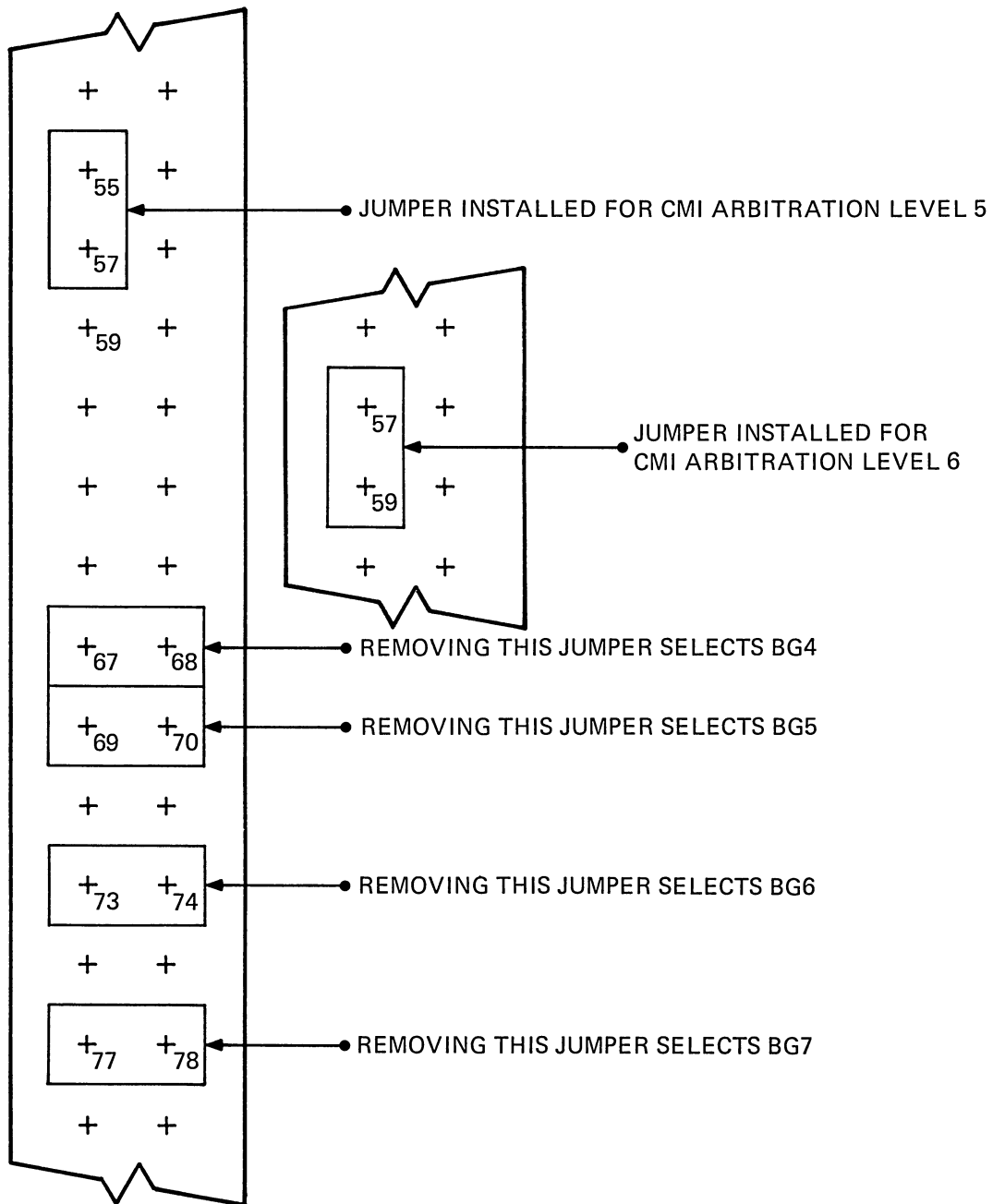
1. Boot the MASSBUS device. If the system fails to boot, verify that the boot ROM is functional by running the ECKAM diagnostic under the Diagnostic Supervisor. This diagnostic reads the ASCII device code, displays the boot ROM type, computes a checksum on the ROM content, and compares the result with the stored checksum in the last byte of the boot ROM. After loading the Diagnostic Supervisor and ECKAM, run Test 7 to verify the boot ROM. The console tape has command procedures to boot the system under the BOOT58 Program.
2. Run the MASSBUS adapter diagnostic, ECCAA (level 3).
3. Remove the terminator from the I/O connector panel plug.
4. Remove the roll bar (Figure 10-8) from the lower back of the CPU cabinet.
5. Connect the MASSBUS cable (Figure 10-9) to the first MASSBUS device.

NOTE

See the VAX Options Installation Manual (EK-VAX-OP-IN) for specific MASSBUS device installation information.

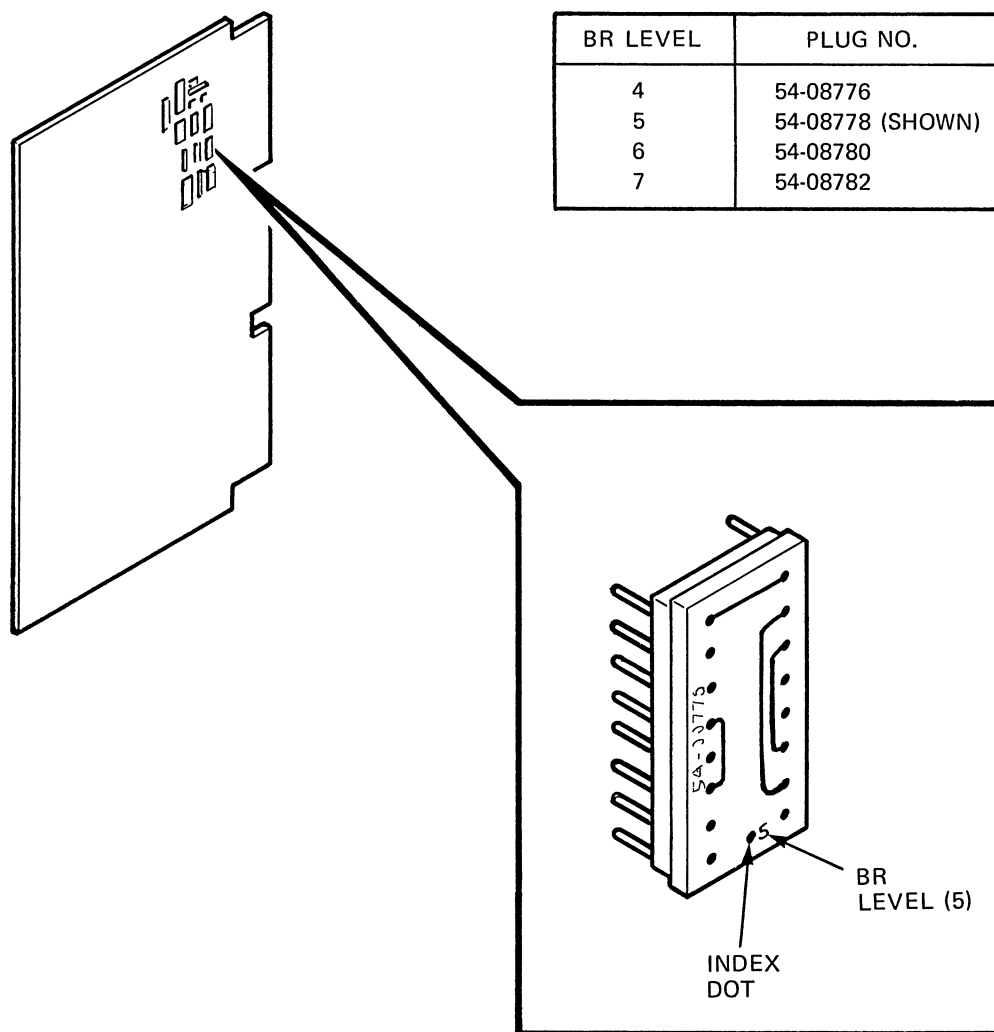
6. Reinstall the roll bar at the lower back of the CPU cabinet.

OPTION SLOT JUMPERS, SECTION A OF
EXTENDED HEX SLOTS 7, 8, & 9



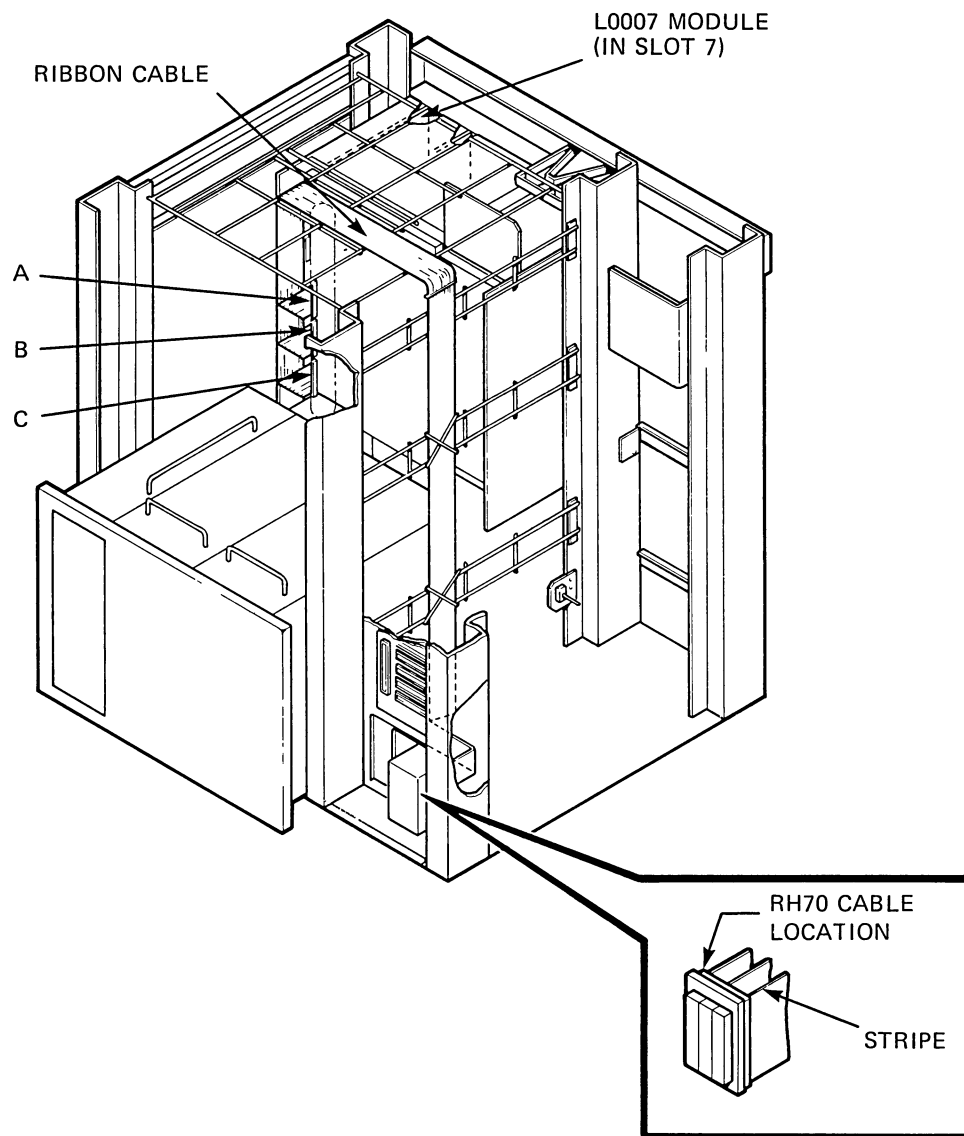
TK-5762

Figure 10-1 Arbitration/Device Number Jumper



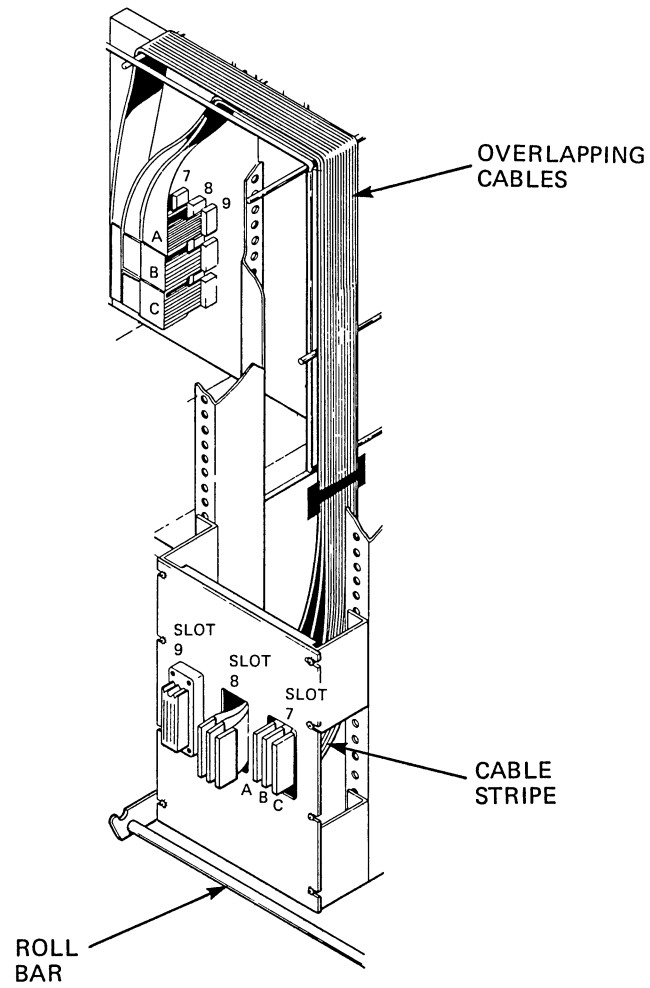
MKV84-0826

Figure 10-2 L0007 Module Priority Plug Location/Details



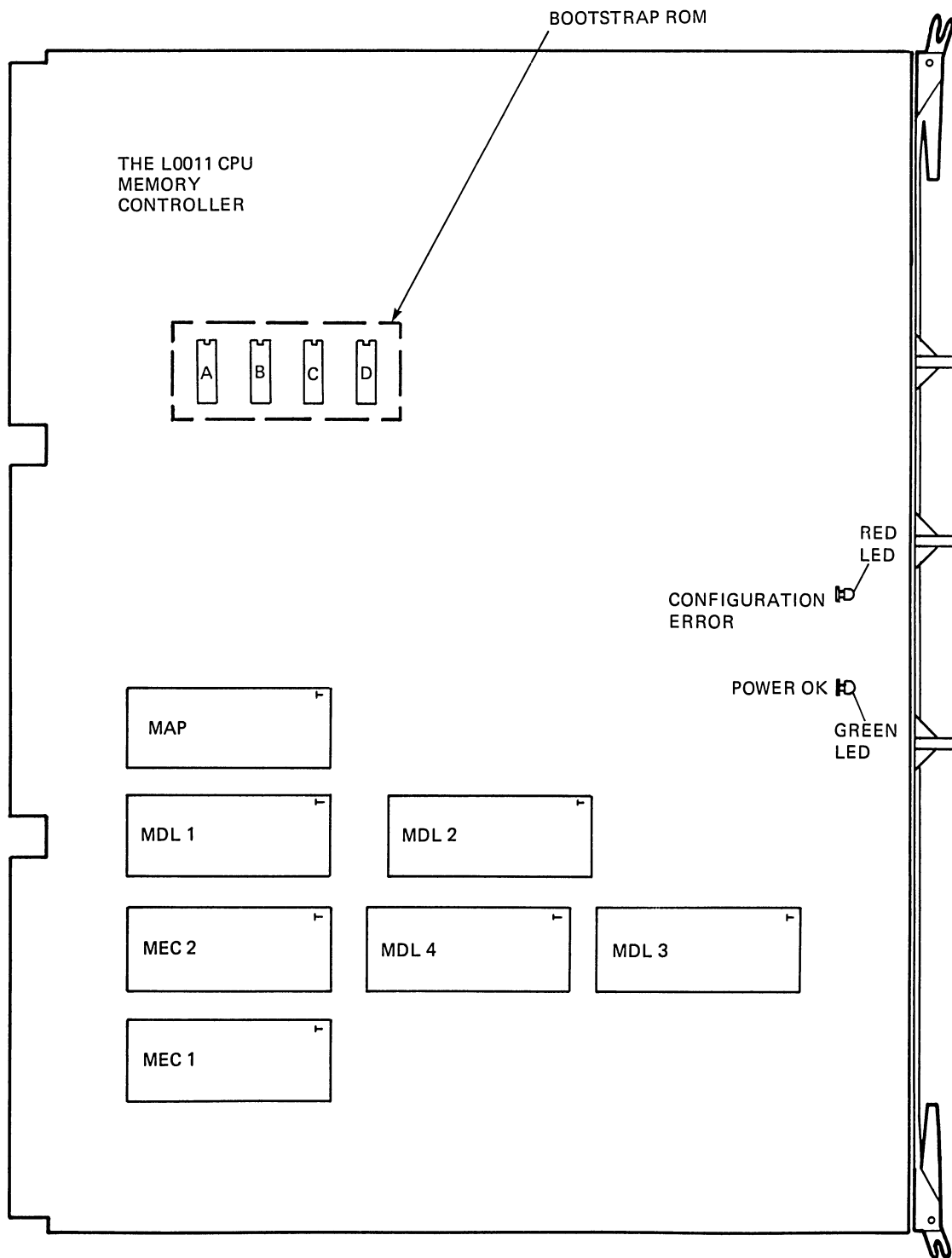
MKV84-0827

Figure 10-3 L0007 Module, Cables Location



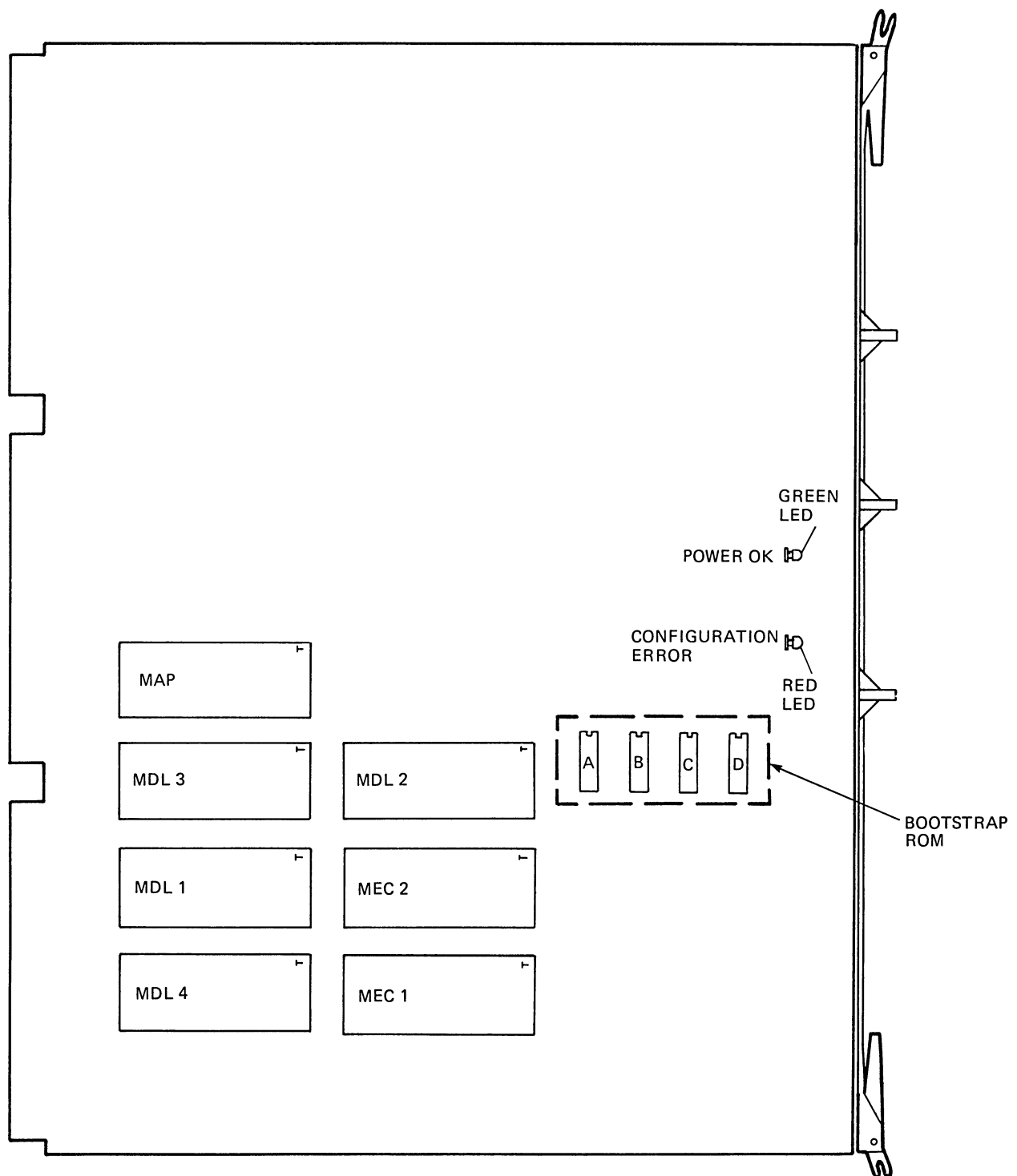
MKV84-0828

Figure 10-4 Multiple Cables Routing Details



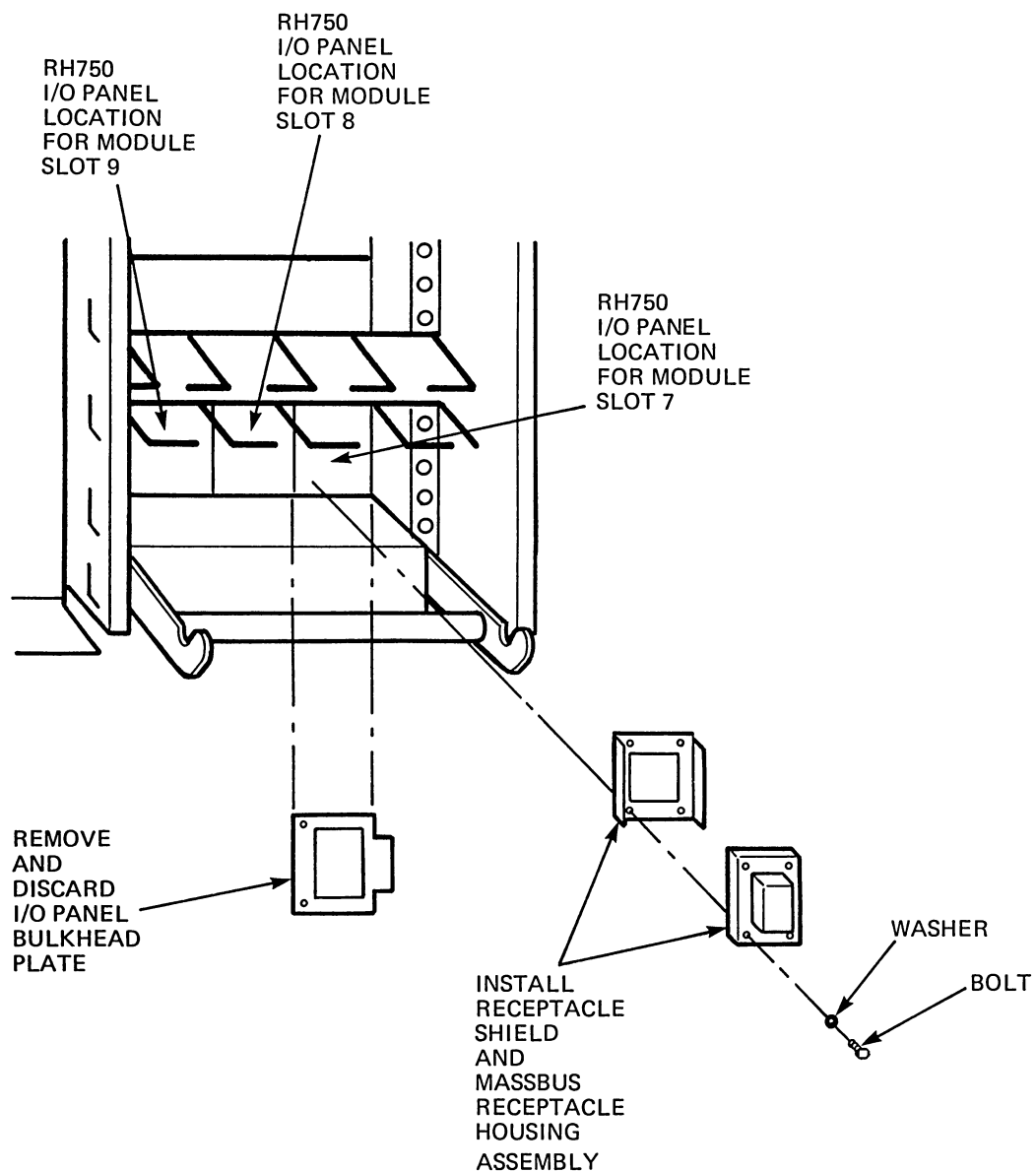
MKV84-0829

Figure 10-5 L0011 Module Bootstrap ROM Locations



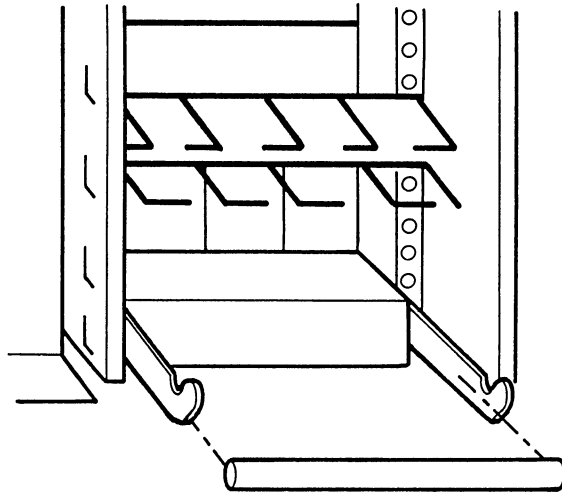
MKV84-0830

Figure 10-6 L0016 Module Bootstrap ROM Locations



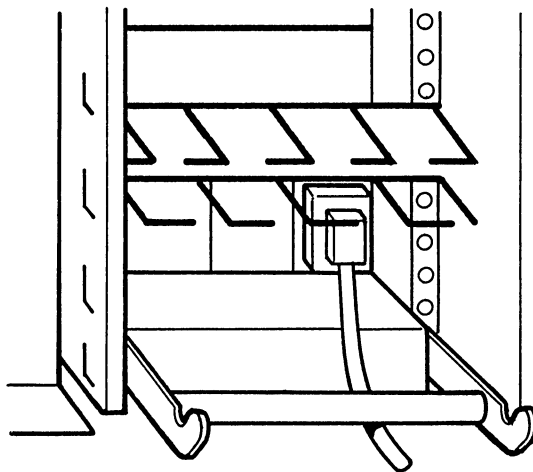
MKV84-0831

Figure 10-7 RH750 MASSBUS Connector Hardware Installation Details



MKV84-0803

Figure 10-8 Roll Bar Removal



MKV84-0832

Figure 10-9 RH750 MASSBUS Cable Installation

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APPENDIX A

COPYING TU58 TAPES

A.1 TAPE COPYING PREREQUISITES

NOTE

The file transfer program FLX is used to copy TU58 tapes. Additional information on the FLX file transfer program can be found in the RSX-11 Utilities Procedure Manual (DEC-11-OXMDA-A-D).

Before a TU58 tape is copied, the following steps must be performed:

1. Connect the console using the SYSGEN utility (unless this has already been done by the system manager).

NOTE

The Help command in the SYSGEN utility is useful for explaining this procedure.

2. Insert a TU58 tape cartridge into the TU58 cassette port.

NOTE

The tape cartridge tab must be in the record position.

Whenever a volume that is currently in FILES-11 format with the foreign qualifier is mounted, you must have the override volume protection user privilege (VOLPRO), or you must be the owner of the volume.

A.2 FLX TRANSFER PROGRAM COMMANDS

A.2.1 Console Connecting and Mount Command

Before writing onto a TU58 tape, you must connect the console using the SYSGEN utility and also mount a write-enable tape.

```
$ RUN SYS$SYSTEM:SYSGEN <CR>
SYSGEN> CONNECT CONSOLE <CR>
SYSGEN> EXIT <CR>
```

```
$ MOUNT/FOREIGN CSA1: <CR>
%MOUNT-I-MOUNTED, MOUNTED ON_CSA1:
```

A.2.2 Initializing Command

This command erases (initializes) TU58 tapes.

```
$ MC FLX <CR>
FLX>CS1:/RT/ZE <CR>
FLX> C
$
```

A.2.3 Write File Command

This command writes a specified file onto a TU58 tape.

```
$ MCR FLX <CR>
FLX>CS1:/RT=FILENAME/RS <CR>
FLX> C
$
```

A.2.4 Deleting File Command

This command deletes a specified file from a TU58 tape.

```
$ MC FLX <CR>
FLX>CS1:FILENAME/RT/DE <CR>
FLX> C
$
```

A.2.5 Read File Command

This command reads a specified file from a TU58 tape.

```
$ MC FLX <CR>
FLX>/RS=CS1:FILENAME/RT <CR>
FLX> C
$
```

A.2.6 Copying Executable Image File Command

This command copies an executable image, such as a diagnostic program, onto a TU58 tape. The IM qualifier identifies the file as an executable image.

```
$ MC FLX <CR>
FLX>CS1:/RT/IM=FILENAME.EXE/RS <CR>
FLX> C
$
```

A.2.7 Writeboot Command

The writeboot command under VMS links the file to the bootfile on block zero and also makes the file bootable.

NOTE

The diagnostic ECKAL and the diagnostic supervisor are examples of bootable files.

MOU/FOR CSA1: <CR>

%MOUNT-I-MOUNTED.

mounted on_CSA1:

\$ MC WRITEBOOT

Target system device (and boot file if not VMB.EXE):

CS1:FILENAME.EXE <CR>

Enter VBN of boot file code (default is 1): 1 <CR>

Enter load address of primary bootstrap in HEX (default is 200):2) <CR>

\$

NOTE

All linked programs that are not specified as system will have a header created that resides in VBN 1 and an executable program that starts in VBN 2. The diagnostic supervisor has a header, thus its executable program starts in VBN 2.

A.2.8 Tape Directory Command

This command will print out the tape directory. Either LI or DI can be used for a qualifier.

\$ MC FLX <CR>

FLX>CS1:/RT/LI <CR>

A.2.9 Example of Copying a TU58 Tape

The following is an example of how to copy a TU58 tape. It shows the commands used to write the diagnostic program ECKAL onto a TU58 tape.

```
>>>B DMA0 <CR>
```

```
%%
```

```
VAX/VMS Version V2.0 6-APR-1980 16:55
```

```
Username: FIELD <CR>
```

```
Password:
```

```
Welcome to VAX.VMS Version V2.0
```

```
$ RUN SYS$SYSTEM:SYSGEN <CR>
```

```
SYSGEN> CONNECT CONSOLE <CR>
```

```
SYSGEN> EXIT <CR>
```

```
$ MOUNT/FOREIGN CSA1:<CR>
```

```
%MOUNT-I-MOUNTED,
```

mounted on_CSA1:

```
$ MC FLX <CR>
```

```
FLX>CS1:RT/ZE <CR>
```

```
FLX>
```

```
Y
```

```
$ MC FLX <CR>
```

```
FLX>CS1:/RT/IM=ECKAL.EXE/RS<CR>
```

```
FLX>
```

```
Y
```

```
$ MC WRITEBOOT <CR>
```

```
Target system device (and boot file if not VMB.EXE):
```

```
CS1:ECKAL.EXE <CR>
```

```
Enter VBN of boot file code (default is 1) : 2 <CR>
```

```
Enter load address of primary bootstrap in HEX default is 200):200<CR>
```

```
$ MC FLX <CR>
```

```
FLX>CS1:RT/LI <CR>
```

```
DIRECTORY CS1:
```

```
22-AUG-80
```

```
ECKAL .EXE 42. 22-AUG-80
```

```
< UNUSED > 460.
```

```
460. FREE BLOCKS
```

```
TOTAL OF 42. BLOCKS IN 1. FILES
```

```
FLX>
```

```
Y
```

A.3 COPYING THE DISTRIBUTION MEDIUM

1. Set the POWER ON ACTION switch to HALT.
2. Set the keyswitch to LOCAL.
3. Insert the standalone back-up cassette tape 1 into the TU58 cassette port.

CAUTION

Ensure that the target disk and distribution media have been loaded.

4. Boot the backup cassette with the command:

B DDA0<CR>

5. Load the second backup tape when prompted into the TU58 tape-cassette port and then do a carriage return.

NOTE

After the second cassette tape has been loaded, you will get the prompt:

\$

6. Type the following command:

\$ BACKUP/VERIFY MAS0:REQUIRED/SAVE DMA1

WHATEVER DRIVE DISTRIBUTION
MEDIA IS ON

WHATEVER DRIVE AND
TARGET DISK IS

7. When you are done, the system will return a "\$" prompt again.
8. Type < P> control P.
9. Remove the second back-up tape cassette and install a blank tape cassette.

NOTE

This tape will become the console tape.

10. Boot the target disk and the system will then prompt with:

"ENTER DRIVE HOLDING DISTRIBUTION KIT"

11. Enter the device name of the distribution media.
12. After it is done, the system will run shutdown.
13. Reboot the system at this point and tailor the parameters to your specifications.

NOTE

See the VAX/VMS System Management and Operations Guide.

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